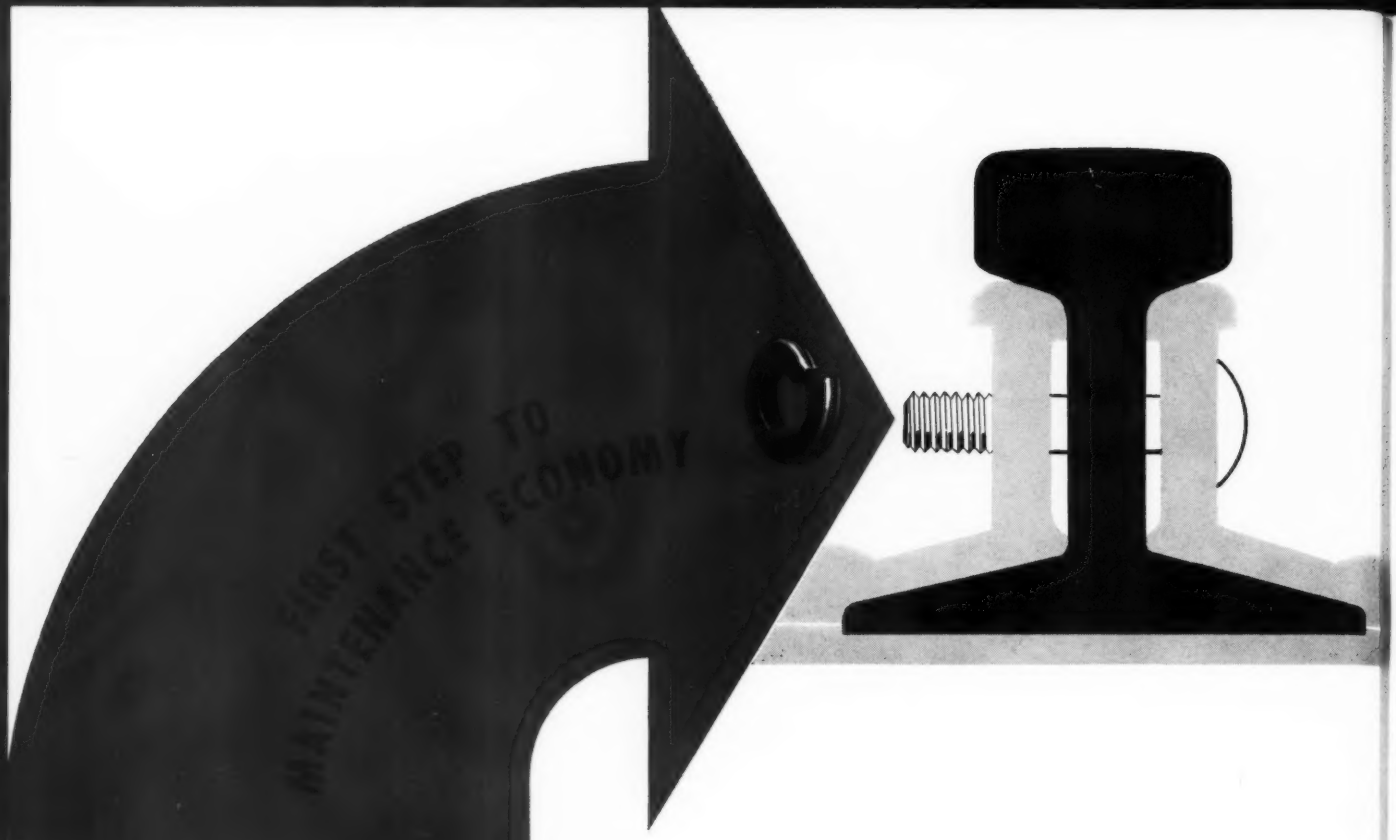
JANUARY, 1951

Railway Engineering and Maintenance

Gulf, Mobile & Ohio Railroad

First in Firsts

The Gulf, Mobile & Ohio traverses the deep South and is the first major railroad completely dieselized. In the early days, the Alton Road, now an affiliate, had the distinction of operating the first Pullman and the first dining-car.



- *A reliable tension device backing up a joint bolt nut is a step toward maintenance economy*
- Using Reliance Hy-Pressure Hy-Crome Spring Washers on track joint bolts is the important first step to economical maintenance. They help reduce rail end batter and joint bar sag, provide a smoother riding track and, by automatically compensating for looseness, keep joint bolts under uniform tension, effecting a reduction of maintenance expense without sacrifice of security.
- With thirty-seven years of experience in supplying railroad spring washer needs, while keeping pace with changing conditions and more exacting requirements through service and laboratory tests, we have been able to develop improved spring washer technique. In the Hy-Crome Spring Washer family can be found a type of spring washer to meet every bolt and service requirement, keeping bolts tighter longer.

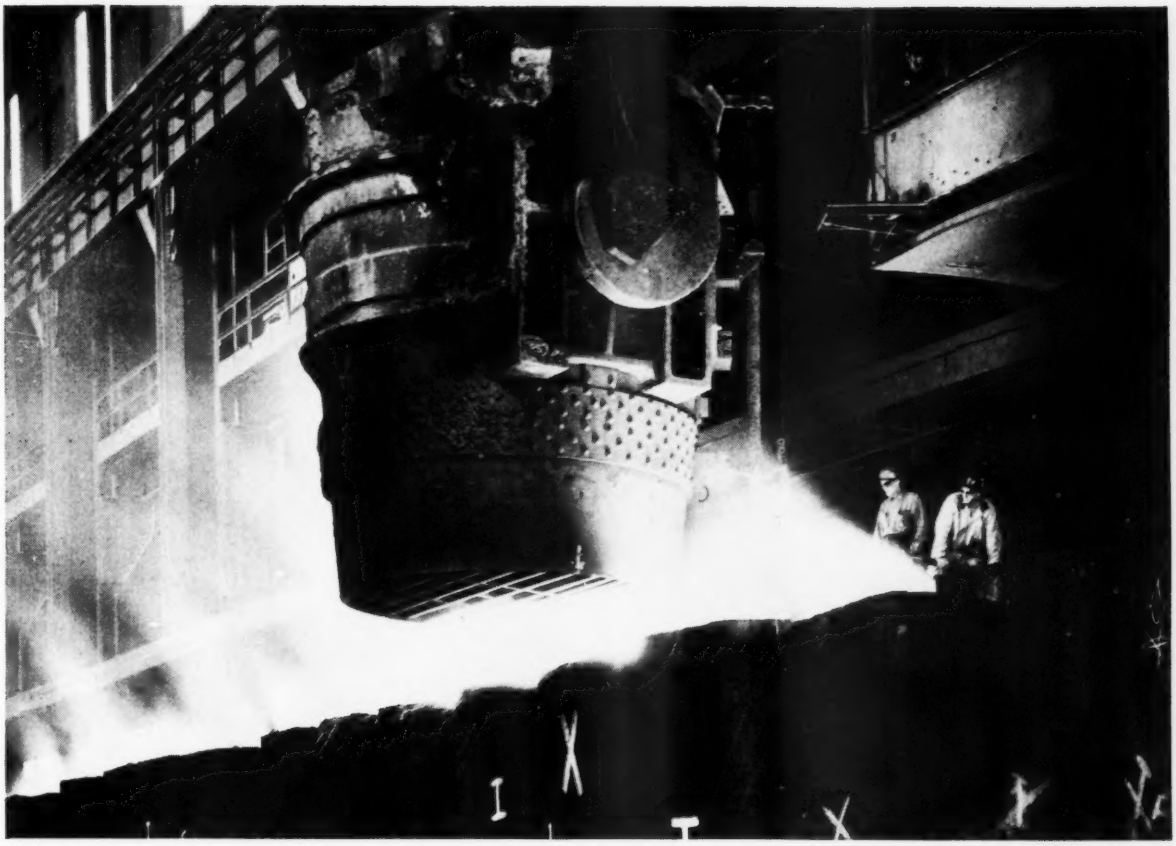
EATON

RELIANCE HY-PRESSURE HY-CROME SPRING WASHERS

EATON MANUFACTURING COMPANY

EATON **RELIANCE DIVISION, MASSILLON, OHIO**

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal



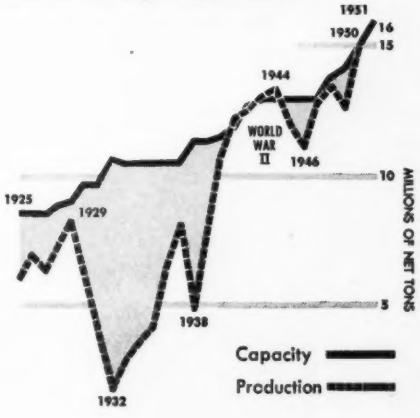
MILLION TONS MORE STEEL

Latest Increase in Bethlehem's Annual Capacity Climaxes 5 Years of Postwar 3,100,000-Ton Expansion

On January 1 of this year Bethlehem's steel making capacity stood at 16 million ingot-tons annually—*an increase of 1 million tons* over a year ago.

Since the war ended we have increased our annual steelmaking capacity *3,100,000 tons, or 24 per cent.*

Moreover, as the chart at the right shows, Bethlehem's steel capacity has nearly doubled in 25 years. Additional capacity can and will be created as it is needed.

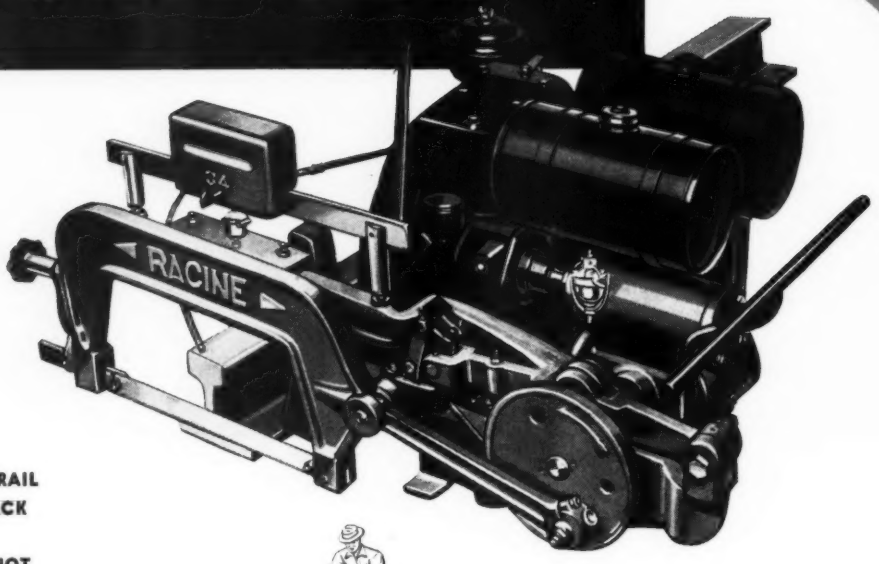


BETHLEHEM STEEL ★ BETHLEHEM STEEL ★

Published monthly by Simmons-Boardman Publishing Corporation, 79 W. Monroe St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Marion, Ind., post office. Address communications to 79 W. Monroe St., Chicago 3, Ill. Volume 47, No. 1.

YOUR EXTRA EMPLOYEE THAT WORKS WITHOUT PAY

RACINE *Portable* RAIL SAW



- CROP RAIL IN TRACK
- WILL NOT SHATTER OR BURN RAIL ENDS
- CUT OFF ANY LENGTH DOWN TO 1/10"
- NO TRAFFIC INTERFERENCE

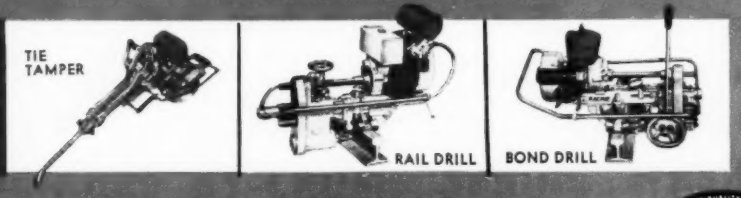
One man operates the RACINE Portable Rail Saw while it does the work of several hands. Designed specifically for cutting rail in track, it handles the job fast and dependably.

Cuts are smooth and accurate. Shattered and burned rail ends are eliminated. The possibility of rail failures from fractures that start with torch cutting or "nick and break" cropping is reduced.

Easily moved by two men, it does not hamper traffic. Operation is simple. Maintenance cost is low. Here is an "extra employee" you can rely upon for steady output under all conditions.

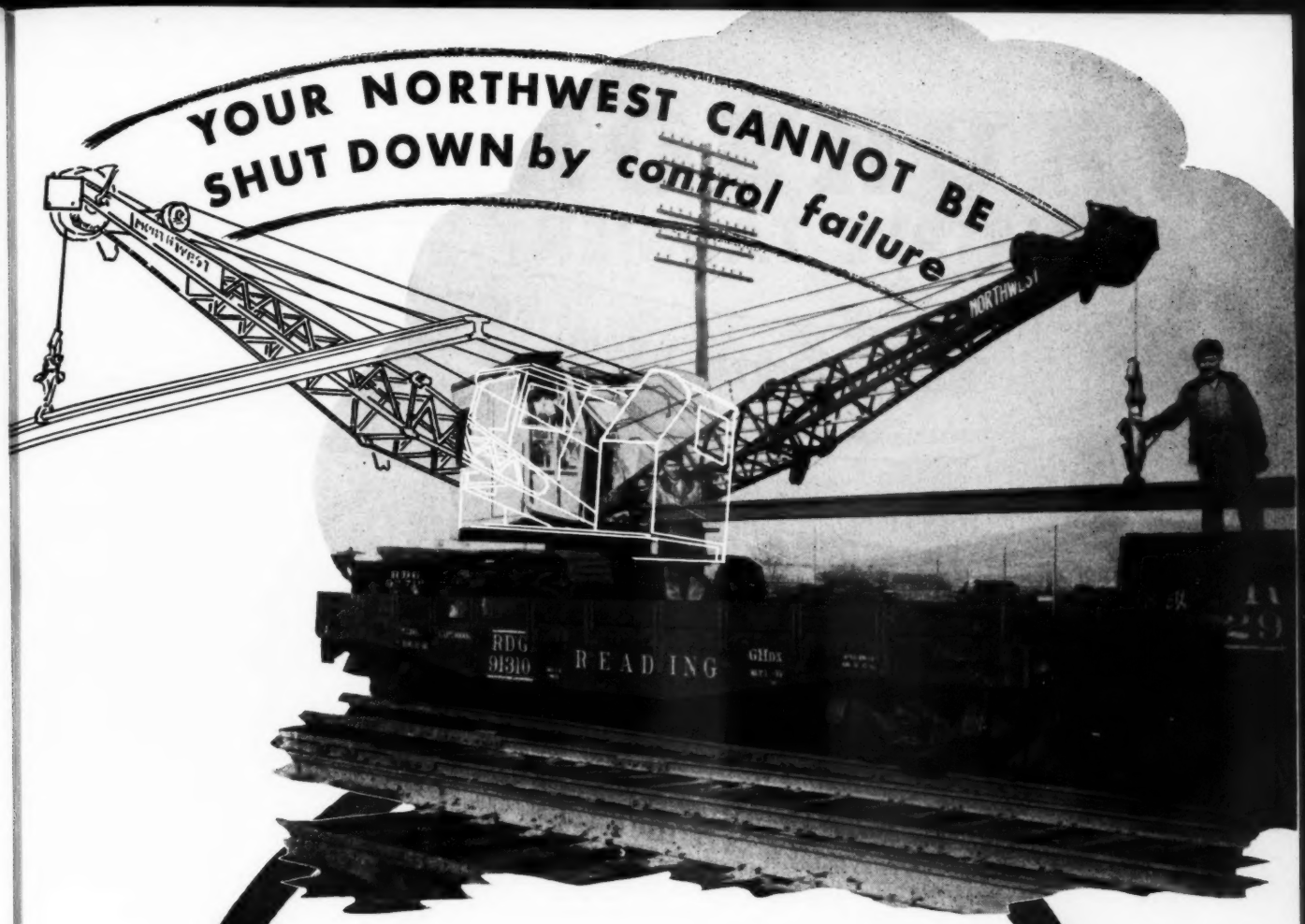
Write for new, 3-color catalog describing RACINE Railway Maintenance Machines.

OTHER RACINE PORTABLE MACHINES



RACINE TOOL AND MACHINE COMPANY
1738 State Street • Racine, Wisc.

YOUR NORTHWEST CANNOT BE SHUT DOWN *by control failure*



THERE must be no control failure on crane operations along the line. Your Northwest *cannot be shut down because of control failure.* On the Northwest, smooth, ease-of-operation is provided by the "Feather-Touch" Clutch Control, a simple drum device free from the complications of pumps, valves or refills.

The "Feather-Touch" Clutch Control utilizes the power of the engine to throw heavy drum clutches. *Release is positive* and the operator does not have to hold the lever to keep the clutch engaged. Operation is in direct ratio to the pressure of the operator's hand. The *feel of the load* is always present. It is unaffected by the temperature, humidity or weather.

The "Feather-Touch" Clutch Control is another of the features that make the Northwest a railway man's unit. It means greater safety and dependability on the line.

Let us give you complete details on Northwest equipment, either crawler or truck mounted.

NORTHWEST ENGINEERING CO.
1513 Field Bldg.
135 South LaSalle Street, Chicago 3, Illinois

MAKE YOUR KEY MACHINE A NORTHWEST CRAWLER
For the heart of the job!

NORTHWEST

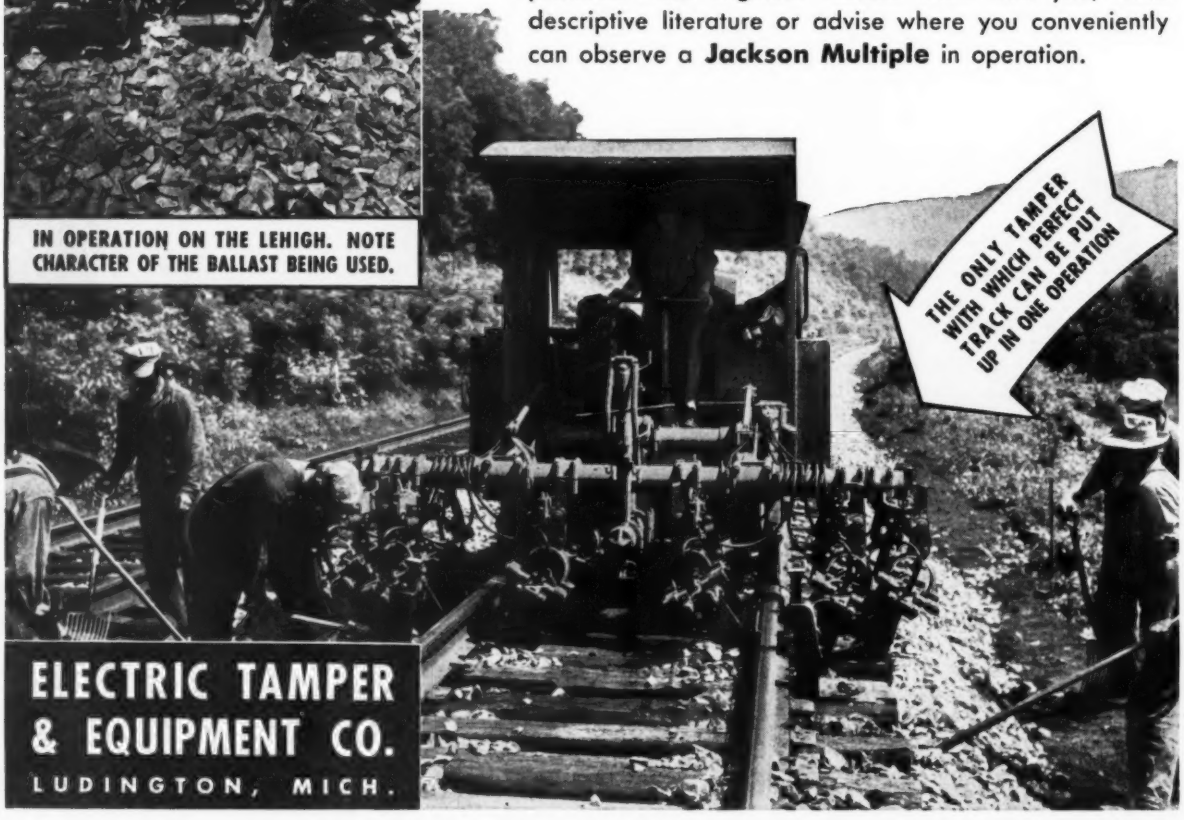
THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL

JACKSON
MULTIPLE TAMPER

DEFINITELY PROVED BY MORE THAN 50 ROADS and CONTRACTORS—The Finest of Major BALLASTING Machines

The surest, shortest, most inexpensive route to the most uniformly-tamped, finest and longest-lasting track is the **Jackson Multiple Tamper.** That is the verdict of more than 50 top-flight maintenance chiefs who during the past three years have used them for major ballasting operations, under practically all of the varying conditions, and employing all the types of ballast normally encountered in putting up track. In the face of what may be the greatest of all labor shortages, unprecedented traffic and high costs, we believe it would pay you handsomely to learn, at once, the great benefits to be derived from the use of these machines. We will gladly arrange to have a thoroughly practical field engineer discuss them with you, send descriptive literature or advise where you conveniently can observe a **Jackson Multiple** in operation.

IN OPERATION ON THE LEHIGH. NOTE CHARACTER OF THE BALLAST BEING USED.

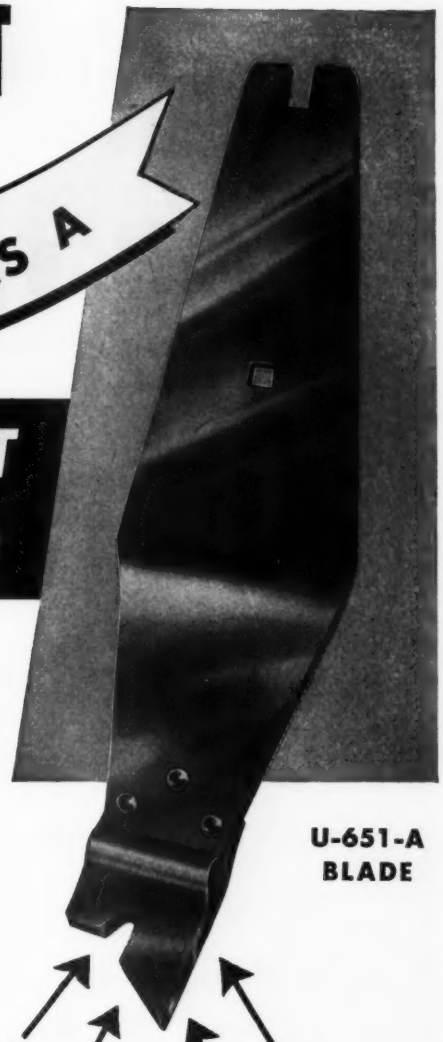


ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICH.

JACKSON
MULTIPLE TAMPER

Now ALSO FUNCTIONS AS A

FAST and EFFICIENT SMOOTHING *Machine*

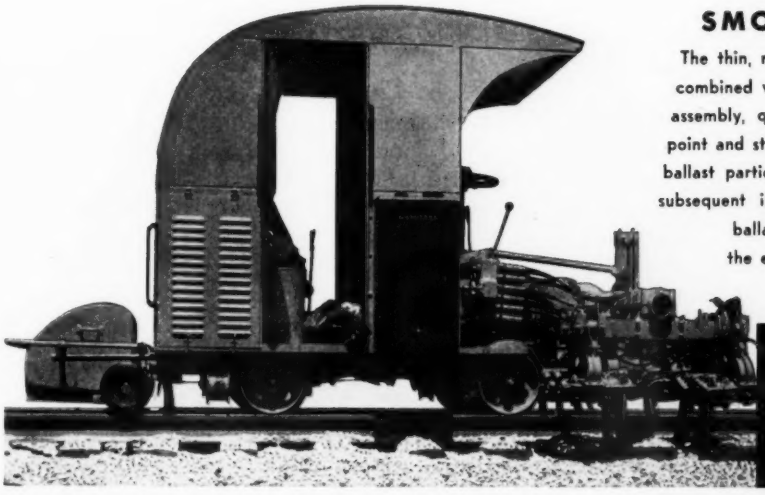


U-651-A BLADE

THE KEY TO FASTER, LESS COSTLY

For those smoothing operations, in which there is little or no raise and no additional ballast is spread, the same **Jackson Multiple** which has proved so highly and universally successful on new ballast insertions, can be quickly converted to a phenomenally fast, efficient smoothing machine. All that is necessary is to change to the narrow blades shown here with their newly developed smoothing tips.

Not only can far more track be put up in this manner, but much greater uniformity and better consolidation are achieved — assuring smooth track ***that stays up!*** Let us tell you more about this tremendously important application of the Multiple Tamper.



SMOOTHING OPERATIONS

The thin, narrow smoothing tip with its vibratory action, combined with the weight of the entire Multiple Tamper assembly, quickly and easily penetrates the ballast. The point and step of the tip pushes and wedges together the ballast particles under the tie, eliminating the voids, and subsequent insertions introduce fine fragments from the ballast section to completely fill and tightly pack the entire bed.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON • MICHIGAN

Makin' beds for the railroad

DOZIN' DOWN THE MAIN LINE: Two International crawlers handle all off-track power jobs along the Great Western right-of-way out of Chicago.

International crawlers improve the roadbed while Great Western traffic keeps rolling

West from Chicago on the Chicago Great Western's main line, miles of old 100-pound rail are coming up—making way for new 112-pound rails that can really take the traffic! And it's International crawlers that prepare the way.

They dig deep and grade smooth with angle-blades. They haul loaded scrapers from cut to fill. They leave behind them a roadbed with stronger, better-banked slopes and better drainage, ready for peak traffic and any weather.

On a hundred off-track jobs, wherever you need brute force combined with champion dependability and top power at bottom operating costs, Internationals make the most of your man-hours and maintenance dollars.

Your International Industrial Distributor is part of a nation-wide service organization that's always at your call, wherever your equipment goes. See him—and see the tractors that deliver power that pays!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL INTERNATIONAL HARVESTER **POWER THAT PAYS**

service records prove

treated car lumber lasts three times longer!

save with Penta*

the clean wood preservative

Every day, more and more railroad men are finding that treated car lumber saves them money. Service records prove that wood treated with PENTA lasts three, sometimes four times longer than untreated wood.

This means that you can amortize PENTA-PROTECTED lumber over a period four times longer than you can untreated wood, thereby lowering the annual cost per car!

Treat your lumber and ties with PENTA, the *clean* wood preservative. Eliminate too frequent replacements and maintenance of wood structures. Use PENTA and have a sound, sure investment in wood.

(*PENTA is a popular abbreviation of the chemical, PENTAchlorophenol.)

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

The Dow Chemical Company
Dept. PE-5
Midland, Michigan

Write for free booklet, "Pointers On Penta"

Name_____ Title_____

Company_____

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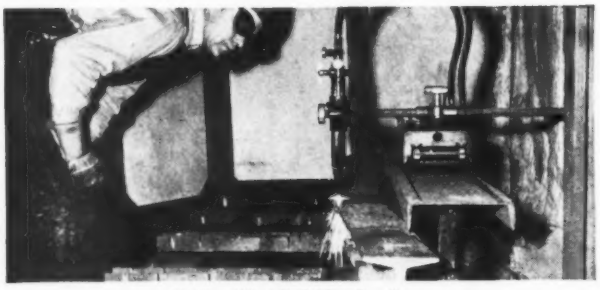
City_____ State_____

DOW Penta chlorophenol

WHAT'S THE BEST WAY

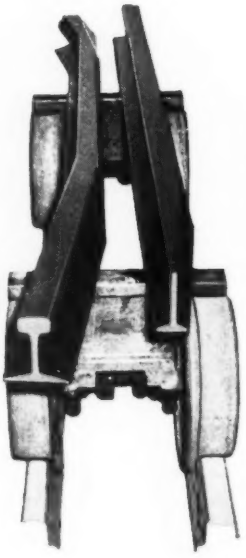
. . . to fabricate rigid frogs?

Heating Wing Rail for Bending Operation



Cutting Wing Rail After Bending

Cutting Long Point Rail



Both Rails After Bending, Cutting and Finishing

Use the Oxyacetylene flame processes!

Airco Railroad Service Representatives recently supervised the fabrication of rigid frogs in a large railroad shop. They observed costs and results. On the basis of this experience, they recommend:

For Bending – heat both the wing rail and the long point rail in required places with the oxyacetylene flame. This simplifies the actual bending operation – cuts time and cost.

For Cutting – make the two cuts on ball and the two on the base of long point rail with the Airco No. 10 Radiagraph (portable, oxyacetylene gas cutting machine) and using the same machine make the necessary cut on the wing rail.

This type of cutting operation was found to be far more economical and less time consuming than doing the same job by other means.

For more information about the above job and other oxyacetylene flame or arc welding applications, write your nearest Airco office.

Costs Come Down Under the Airco Plan

AIRCO

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

After more than a million miles, the first Aluminum boxcar is in "perfect condition"

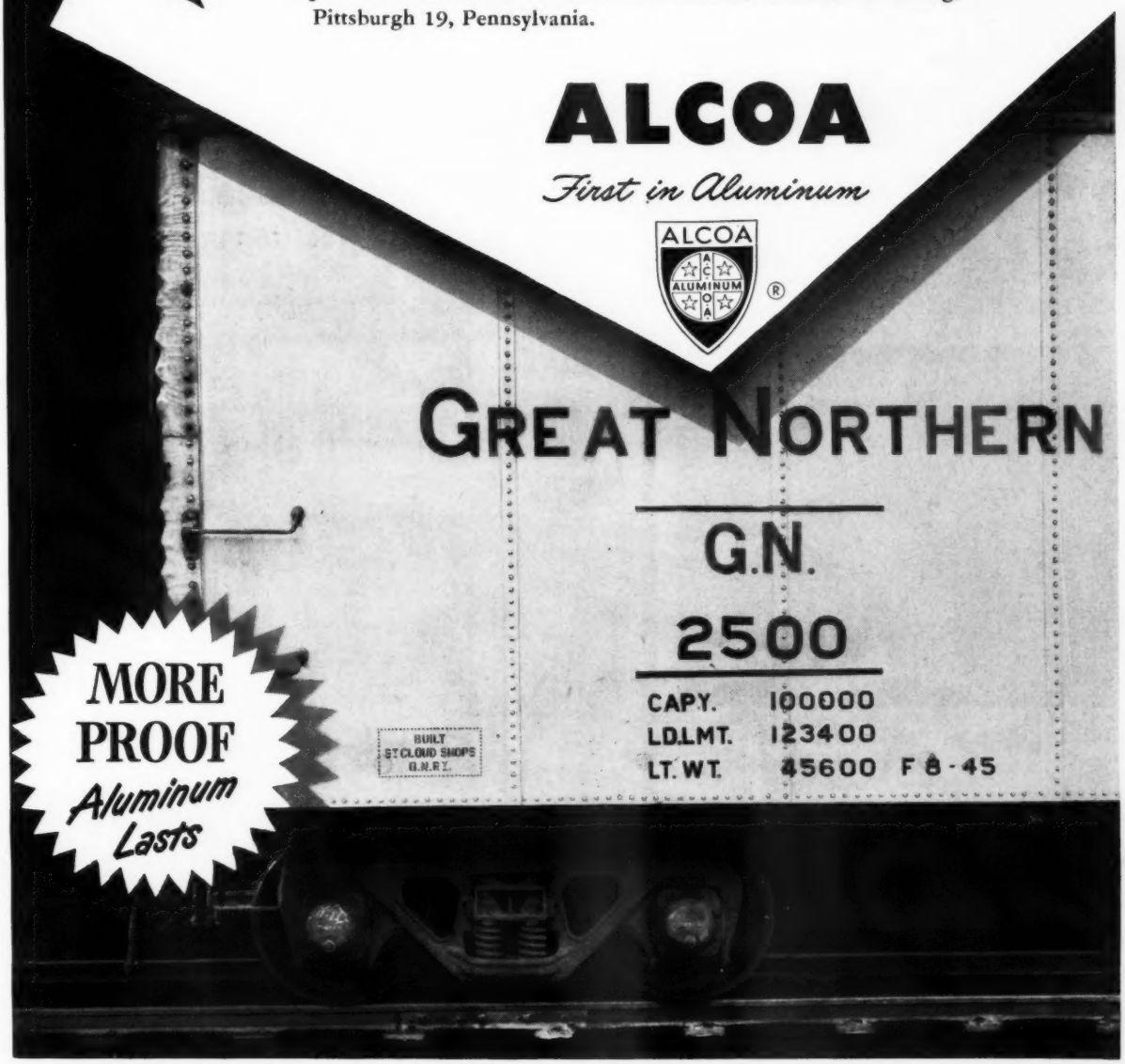
There's food for thought in the impressive record rolled up by Great Northern's famous No. 2500.

Built of Alcoa Aluminum in November, 1944, it has averaged 15,000 miles a month since then—mostly at express-train speeds. Has never required major maintenance or repairs. Every inspection report has been the same—*"Condition perfect"*.

It's a record worth remembering. A record which will help you plan for future equipment that will earn more revenue, cost less to operate. ALUMINUM COMPANY OF AMERICA, 1820A Gulf Building, Pittsburgh 19, Pennsylvania.

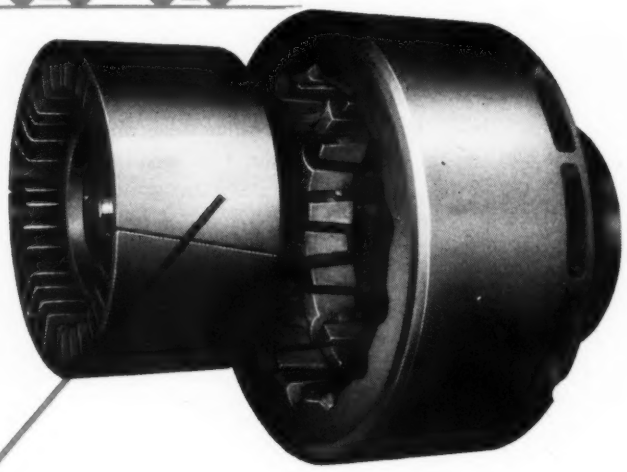
ALCOA

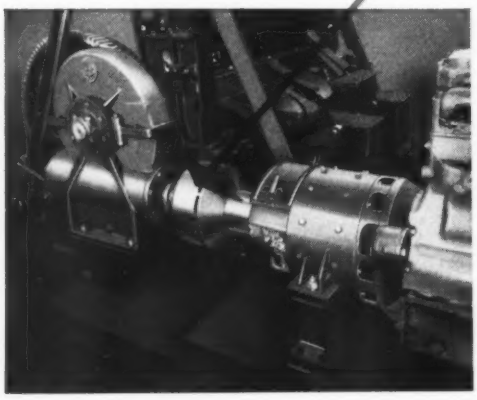
First in Aluminum



NOW AVAILABLE ON BROWNHOIST LOCOMOTIVE CRANES . . .

new dyna-matic clutch





For Smooth, Acceleration, and Control of Hoist, Rotating and Travel

The new, electrically operated DYNAMATIC CLUTCH, available only on Brownhoist locomotive cranes, provides a smooth, responsive flow of power never before possible with the usual disc or mechanical clutch for transmitting power to the machinery of a crane. The DYNAMATIC CLUTCH is essentially a driven rotor revolving on anti-friction bearings within a rotating coil energized by a small flow of current from the starting battery. The new DYNAMATIC CLUTCH has a 32-step control. Power response is steady and sensitive. Loads may be raised, lowered, or rotated smoothly and accurately without the use of mechanical brakes. Torsional impulse and vibration from the power source is completely eliminated. The DYNAMATIC CLUTCH provides a cushion between the engine and crane machinery. When clutch is fully engaged there is no appreciable slippage. Since there is no contact between the revolving field and armature, there is no friction between moving parts nor drag between the parts when the controller is in the off position — no parts need replacement other than inexpensive brushes. The new DYNAMATIC CLUTCH is one more good reason it pays to buy a BROWNHOIST.

142

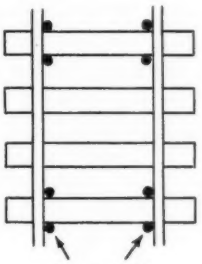
BROWNHOIST

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, Chicago, San Francisco, Canadian Brownhoist Ltd., Montreal, Quebec. AGENCIES: Detroit, Birmingham, Houston, Los Angeles, Portland, Seattle, Spokane.

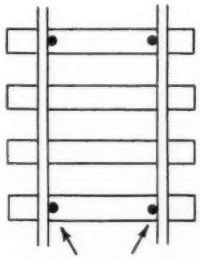
The Time to SAVE MONEY *on Your Track is when it is being* CONSTRUCTED!

In a Mile of Track there are:

- 133 Rail Lengths
- 3,192 Ties
- 6,384 Tie Plates
- 25,536 Track Spikes
- 4,256 Conventional Anchors



Conventional Anchors



Our 1-piece 2-way Compression Anchor

Eliminate Maintenance . . Minimize material costs as outlined below . . .Yet double the lateral strength of your track.

By eliminating 4,256 spikes we save	$ 298.00
By eliminating driving cost of 4,256 spikes, we make a labor saving of	170.24
Saved per mile	468.24
Using Conventional Anchors to accomplish TWO WAY ANCHORAGE requires 4,256 anchors at a cost of	1,276.80
Using the NO-CREEP RAIL ANCHOR to accomplish TWO WAY ANCHORAGE requires 2,128 anchors at a cost of	638.40
In each case above, 8 ties are anchored TWO WAYS. Saved	638.40
Savings in materials and labor per mile of track: Saved on Anchors	638.40
Saved on Spiking	468.24
Saved per mile of track	1,106.64

THE GREATEST SAVING PER MILE OF TRACK IS IN MAINTENANCE

It costs about $0.04 each to knock off, reset and redrive an Anchor. There are 4,256 anchors in a mile of track.

Cost per mile of setting anchors 4,256 x $.04	$ 170.24
Most railroads program this operation twice a year—for summer and winter; so 2 x $170.24 gives cost per mile per year	340.48
Cost for 10 years, per mile	3,404.80
Cost for 100 miles, 10 years	340,480.00

All of this maintenance cost is ELIMINATED WITH THE NO-CREEP Rail Anchor

The combined savings in material, labor and maintenance, over a ten year period are impressive.

Amount of maintenance eliminated	$340,480.00
Amount of materials and labor eliminated	110,664.00
Total Savings—10 years, 100 miles	$451,144.00

The hold down part has been designed to fit in the spike hole on gauge end of plate to produce quality welds. Using the UNIONMELT automatic welding head we can now turn out as many as 2,500 welds per 8 hours per welding unit.

The

NO-CREEP

Rail Anchor

is the only fully self-compensating Anchor on the market: it compensates for all weather, TEMPERATURE and Traffic conditions, Continuously. It is self-adjusting; insert it and FORGET IT. Ask the Road Master.

Write for details.

Phone BALTIMORE 1700

G & H RAIL CONTROLS, INC.

1704-6 Baltimore Ave. Kansas City 8, Mo.

Chicago Representative: Gurley-Ortman Co. RR & Industrial Supplies, 332 So. Michigan Ave., Chicago, Ill.

IN '51 . . . PLAN for ECONOMIC RESULTS with BOGLE "Tested" HERBICIDES

TCA - CHLORATE
TCA - ARSENITE
CHLORATE - CHLORIDE
SODIUM ARSENITE
and BRUSH KILLER

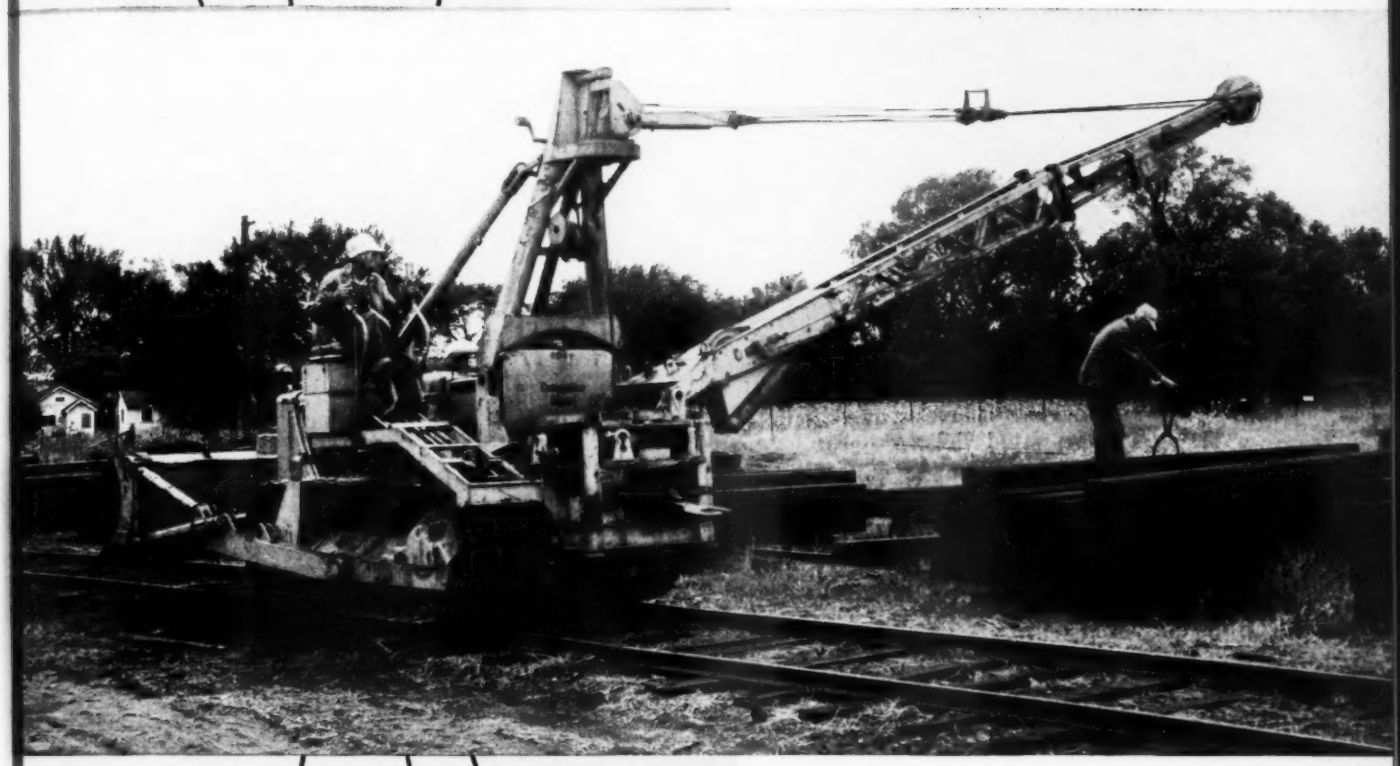
Complete Roadbed and Right-of-Way Weed Killer Service

The R. H. BOGLE COMPANY

ALEXANDRIA, VIRGINIA

ATLANTA, GA. **MEMPHIS, TENN.**

IT DOES 'EM ALL!



LOOK UNDER THE HIDE Connecting rods for "Caterpillar" Diesels are made of medium carbon steel, drop forged and heat treated. Of "H" section design, they are rifle drilled to provide oil passage to the piston pin, and to oil-cool the piston. Connecting rods are balanced to close limits. Crankpin bearings are solid aluminum alloy, precision type. Piston-pin bushings are bronze and are precision bored. Look under the hide for built-in quality.

CATERPILLAR

REG U S PAT OFF

DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

YOU'RE looking at a rig that does a lot of different jobs fast and well. On the front, this "Caterpillar" D6 Tractor is equipped with a 'dozer. On the rear, it has a Hystaway Dragline used with a ⅜ bucket, ⅜ clamshell or grappling tongs. That's a 3,300-lb. boom under the trolley. Twelve months a year this versatile rig is kept busy on 130 miles of track for the W.C.F. & N. R.R., Waterloo, Iowa.

"We use it for everything," says Nathan B. Barber, Construction and Maintenance Engineer. "Originally it was purchased for ditching, but soon lots of other uses were found for it. When a train comes, we can get right off the track—and then get right back on again. We have plowed snow from Waterloo to Cedar Falls and back. The 'Cat' D6 has given us good service with low fuel consumption."

You'll hear many reports like this about "Caterpillar" equipment on the right of way. Time after time, it's proved its worth by slashing the cost and time of maintenance and construction. The ruggedness *built into* every unit assures you dependable performance with a minimum of down-time. And that's mighty important these days with the vital need for keeping things moving for civilian and defense requirements. Your "Caterpillar" dealer is close by, equipped to provide efficient parts and repair service. With conditions as they are, it's a good move to talk over your machinery requirements *now*.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

HERE'S PROOF that AMCRECO big dividends maintenance

THE PROOF is in this test crib which has been exposed to the weather for over 39 years!

- **These four ties were not treated**
- **The balance of these ties were treated by the AMCRECO LOWRY PROCESS**

The Amcreco Lowry Process Creosoted Cross Ties shown in the recent photograph at the right were taken from the first charge of ties treated for the New York Central Railroad and cribbed together in 1911 at the Amcreco plant in Rome, N. Y. Four untreated heart longleaf pine ties—then considered to be the longest lived ties available—were laid on top as indicated by the checks. The treated ties are still in perfect condition; the untreated ties failed long ago.

THE exacting demands of modern railroading with heavier loads, greater traffic and higher speeds make the economies of Amcreco Lowry Process Treatment more obvious than ever before. Amcreco treatment is a vital contribution to lower operating costs, greater safety and forest conservation.

The tie renewal record of the Delaware, Lackawanna and Western Railroad shown on the opposite page is typical of the economies that can be effected through the use of Amcreco Lowry Process Treatment.

The extensive facilities and experience of the Amcreco organization are available to all railroads and we urge you to take advantage of them. Your inquiries are invited.

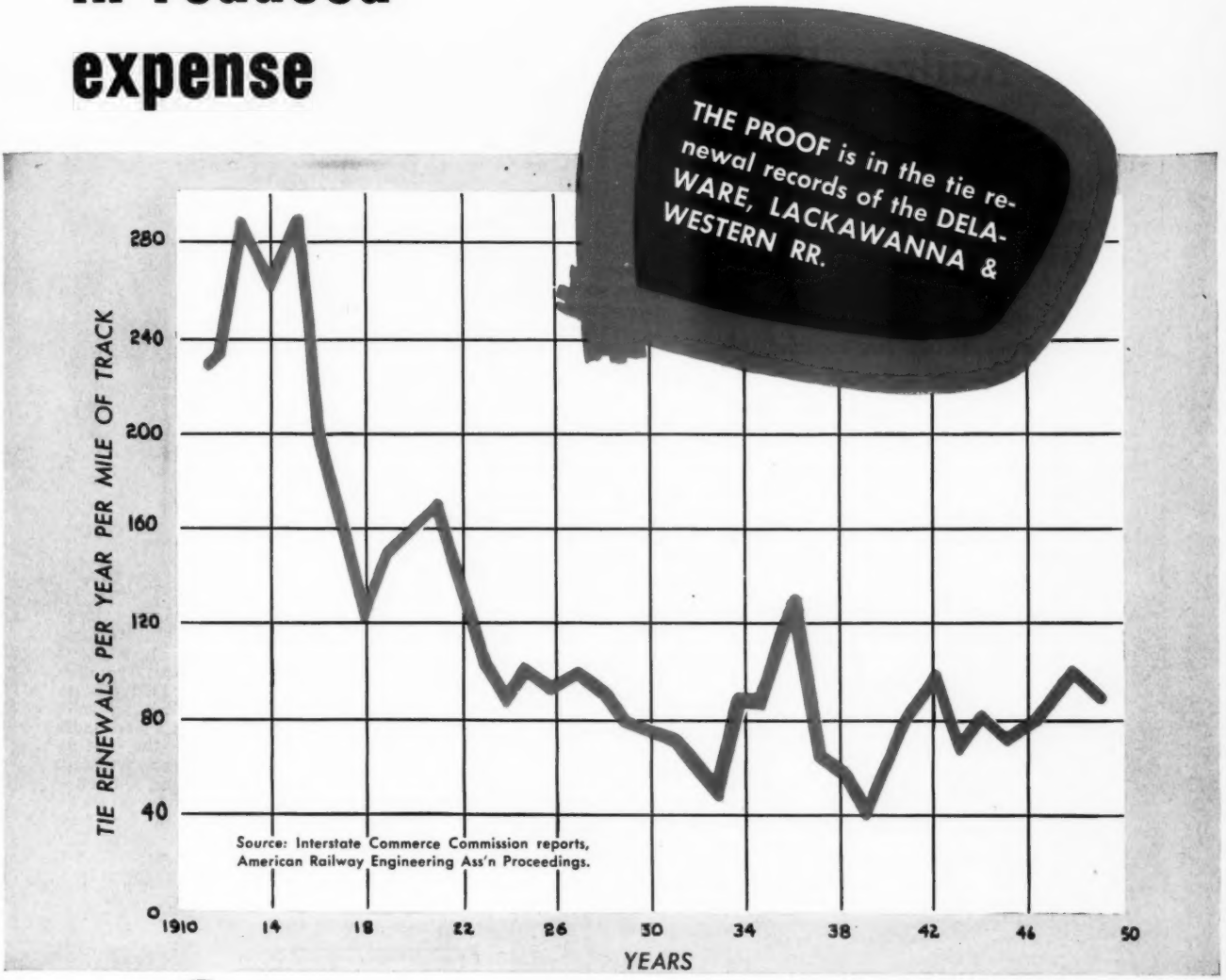
AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AMCREO LOWRY PROCESS

GEORGIA CREOSOTING COMPANY INCORPORATED

Lowry Process pays in reduced expense



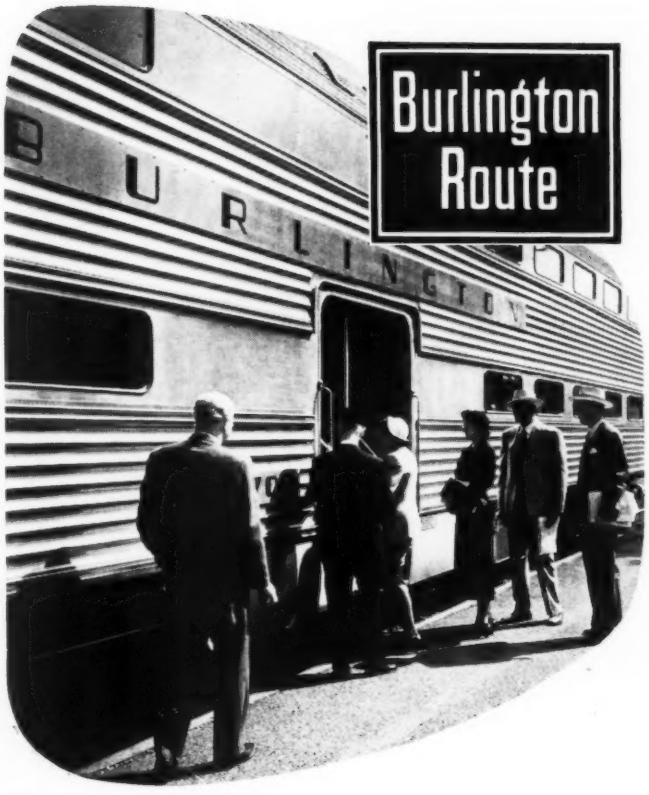
THE chart above dramatically illustrates the benefits secured by the Delaware, Lackawanna and Western Railroad after instituting a program of preservative treatment of its cross ties. Note how rapidly the tie replacement curve drops off after 1915 as more and more untreated ties were replaced with Amcreco-treated ties.

Previous to treatment, annual tie replacement averaged over 250 per mile of track. Since the Amcreco program was put into effect, replacements have been reduced to an average of less than 100 per year per mile of track—and this in the face of far heavier loads, heavier traffic and higher speeds . . . Proof of the economy of Amcreco Treatment.

CROSS TIES
BRIDGE TIES
AMCRECO CREOSOTED PRODUCTS
Pressure Treated by the Lowry Process for strength that lasts!
PILES
TIMBERS

PROPERTY OF LIBRARY
PUBLISHING CORP.
30 CHURCH ST
NEW YORK, N.Y.

Progressive Railroading



QUICK to adopt the best in new ideas, the Burlington once more pioneers in the use of radical new equipment for passenger service. In its maintenance departments the "Q" is no less enterprising, and mechanized work equipment, including WOOLERY Tie Cutters, has long been employed on the Burlington right-of-way to produce the best results with the greatest economy.

The WOOLERY Tie Cutter and Undercarriage enables one man to quickly cut each worn tie into three easily-removable pieces which can be lifted out without disturbing the ballast, so that new ties may be re-seated on a firm bed. With this modern machine the entire cutting operation is performed without lifting or turning, by traveling the cutting mechanism across the undercarriage to cut both ends of the same tie, and rolling the whole apparatus along the rails to successive tie positions. Total cutting time per tie is less than two minutes.

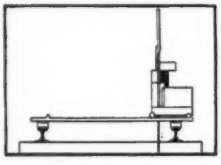


Figure 1—Making first cut at right end of tie, close inside rail.

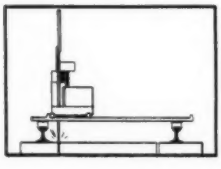
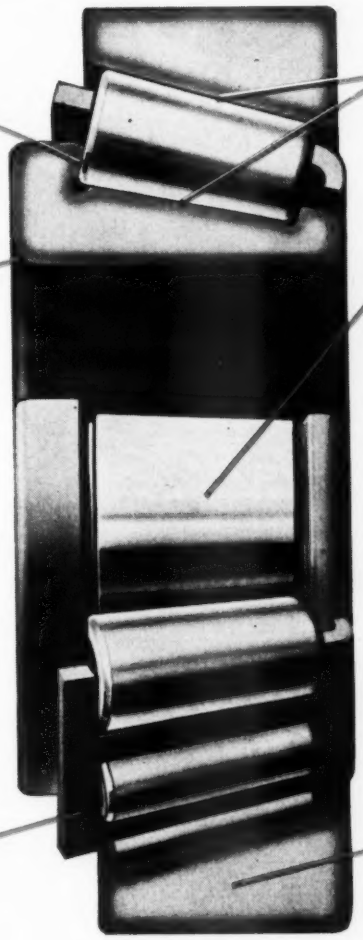


Figure 2—With machine moved to left end of tie, making second cut.

OTHER WOOLERY MAINTENANCE UNITS
Weed Burners, Creosote Sprayers, Motor Cars, Flangeway Cleaners, Tie Plate Spacers, Rail Joint Oilers

WOOLERY MACHINE COMPANY
MINNEAPOLIS MINNESOTA
Pioneer Manufacturers of **RAILWAY MAINTENANCE EQUIPMENT**
RAILWAY WEED BURNERS • MOTOR CARS • FLANGEWAY CLEANERS • TIE CUTTERS • TIE PLATE SPACERS • RAIL JOINT OILERS • CREOSOTE SPRAYERS
EXCLUSIVE EXPORT REPRESENTATIVES: PRESSED STEEL CAR COMPANY, INC., NEW YORK, N. Y.

10 reasons why your best bet in bearings is TIMKEN®



1 *Rib of cone maintains roller alignment, prevents skewing, assures maximum bearing capacity.*

2 *Generous radius permits greater shaft strength.*

3 *Available in 26 different types.*

4 *Precision manufactured. Available with runout tolerance of only seventy-five millionths of an inch (.000075").*

5 *Soft steel cage separates rollers, prevents scuffing.*

6 *Case-hardened surfaces resist wear.*

7 *Micro-inch surface finish makes friction negligible.*

8 *Available in 5850 sizes.*

9 *Made from Timken fine alloy steel for long bearing life.*

10 *Tough inner core resists shock.*

OTHER tapered roller bearings may *look* like Timken® bearings. But there is no other tapered roller bearing which gives you as many important advantages as you get with Timken.

Ten of these advantages are listed above. They all stem from the fact that the Timken Company is the foremost producer of tapered roller bearings and leads in (1) advanced design, (2) precision manufacture, (3) rigid quality control, (4) special analysis steels.

Be sure that every tapered roller bearing *you* use carries the name "Timken", the trade-mark of The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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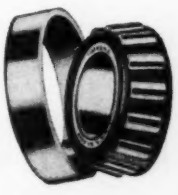
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ⇧⇩ AND THRUST →⇩← LOADS OR ANY COMBINATION →✳←

NOW TWO MORE *Completely New*

HD-9

WEIGHT: 18,500 lb.
70 DRAWBAR Hp.
GM 4-71 DIESEL ENGINE
SPEEDS: 6 forward, to 5.68 mph.; 3 reverse, to 4.43

OUT AHEAD

Modern Allis-Chalmers Line sets New Tractor Standards

HD-5 HD-9 HD-15 HD-20

Each of these four Allis-Chalmers crawlers gives you a new yardstick for rating tractors. Each brings you a new kind of performance . . . plus new strength, operator comfort and service simplicity. For the finest in crawler tractors, see your Allis-Chalmers dealer.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

The World's Most Modern Line of Crawler Tractors

Allis-Chalmers Tractors

NEW POWER RATING

POWER, WEIGHT, BALANCE put them in a class of their own — never such traction . . . such pulling, pushing or lifting ability. And the smooth-operating GM 2-Cycle Diesel engines work without strain under the most extreme conditions.

NEW STRENGTH

All parts are designed and built to carry their loads with a margin of safety. No need to go to a larger tractor just for strength alone. The HD-9 and HD-15 set new standards for tractor quality.

- ✓ For Greater Production
- ✓ For Easier Operation
- ✓ For Simplified Servicing

NEW DESIGN SIMPLICITY . . .

for Easier Control and Greater Operator Comfort— Easy-shift transmission • Self-energizing brakes • Booster steering controls • Adjustable, cushioned seat • Wide arm rests • Convenient controls and pedals • Full visibility • Instant electric starting.

for Simplified Servicing — Unit construction permits removing major assemblies without disturbing companion groups • Extended lubrication periods throughout—1,000 hours on truck wheels, idlers and support rollers.

Complete Line of Matched Equipment, Developed in Cooperation With Allied Manufacturers, Available For Both The HD-9 and HD-15.

HD-15

WEIGHT: 27,500 lb.
102 DRAWBAR Hp.
GM 6-71 DIESEL ENGINE
SPEEDS: 6 forward, to 5.80 mph.; 3 reverse, to 4.51

ECONOMY IN THIS BUILDING

IS NO FRAME-UP

Here's how you save money when you erect an Armco STEELOX Building. There is no separate framework. The patented STEELOX Panels provide both structural support and finished surface.

Erection costs are low. Your regular crew can do the job by following instructions that come with each structure.

Economy continues after your STEELOX Building is up. There is nothing to warp, crack, or get out of order. An occasional painting is about all that is ever needed. Even here, the special Armco ZINCGRIP-PAINTGRIP Steel takes paint readily and holds it longer.

STEELOX Buildings are fire-resistant and there is no danger of obsolescence. Doors and windows can be easily moved or the building can be extended with standard parts. If necessary it can be moved to a new site without loss of material.

Write for complete information now and you'll have it for ready reference. Armco Drainage & Metal Products, Inc., 1551 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

Armco STEELOX Buildings

ARMCO

C-C RAIL Contains . .

HIDDEN DEFECTS!

Transverse Defects Found by Sperry Rail Cars

Most railroads now include testing of CC rail in their rail testing programs because transverse defects have not been eliminated in CC rail.

Although CC rail has largely eliminated one type of defect, the transverse fissure; it has not eliminated other equally dangerous types of transverse defects, notably detail fractures.

Table 1. Defects detected in CC rail — March 1 to Aug. 31, 1950

TYPE OF DEFECT	NO. OF DEFECTIVE RAILS	MILES PER DEFECT	% OF TOTAL
Transverse Defect *	2137	10.87	96
Horizontal Split Head	34	660	2
Vertical Split Head	26	860	1
Miscellaneous	12	1850	1
TOTAL	2209	10.52	100

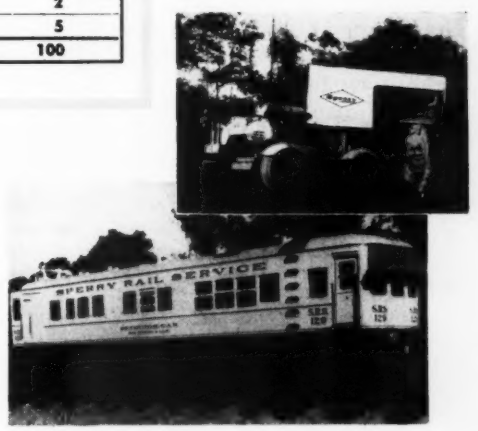
* Including Engine Burn Fractures

Table 2. Size of Transverse Defects * detected in CC rail

SIZE	NO. OF DEFECTIVE RAILS	MILES PER DEFECT	% OF TOTAL
Small (0-20%)	1684	13.8	84
Medium (21-40%)	174	133	9
Large (over 40%)	44	525	2
Cracked Out	97	240	5
TOTAL	1999	11.6	100

* Excluding Engine Burn Fractures

CC RAIL TESTED WAS 26% OF THE TOTAL MILEAGE TESTED FROM MARCH 1 TO AUGUST 31. DEFECTS DETECTED WERE 12% OF TOTAL DEFECTS IN TOTAL TESTED MILEAGE.



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FIRST IN RAIL TESTING

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Division of Sperry Products, Inc.
DANBURY, CONNECTICUT

110 E. 42nd STREET
NEW YORK 17, N. Y.

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CHICAGO, ILL.

818 OLIVE STREET
ST. LOUIS 1, MO.

Mining Gold

FOR THE RAILROADS

When Pullman-Standard Power Track Cribbers start digging . . .

—cribs come clean in seconds . . .

—and track-maintenance costs take a nose dive.

Suppose *we* dig into just one of numerous case histories, and let the results recently reported by a leading railroad system tell their own story . . . of "gold-mining" performance by Pullman-Standard *Power Track Cribbers*.

DATA FILE "X"

CRIBBING WITH POWER TRACK CRIBBER

Type of ballast: hard, cemented rock.
Single-track operation.
Total cribs cleared: 10,108.
Cribs per minute: 1.8.
Time per crib: 32.8 seconds.
Labor cost per crib: 13.8¢.
Labor cost per mile: $430.00.

COMPARISON WITH HAND CRIBBING (estimated)

Labor cost per crib: 61.5¢.
Labor cost per mile: $2,000.00.

SAVING—MACHINE vs. HAND CRIBBING

In labor cost per mile: $1,570.00 (78%).

Mechanized track maintenance with Pullman-Standard equipment offers *proved economies*, to set against increased wages and the 40-hour week. The Pullman-Standard Power Track Cribber *alone* can effect great savings—and its teammates, the Ballast Cleaner and the Ballaster, may be used with it, in production-line sequence, to save additional costly man-hours.

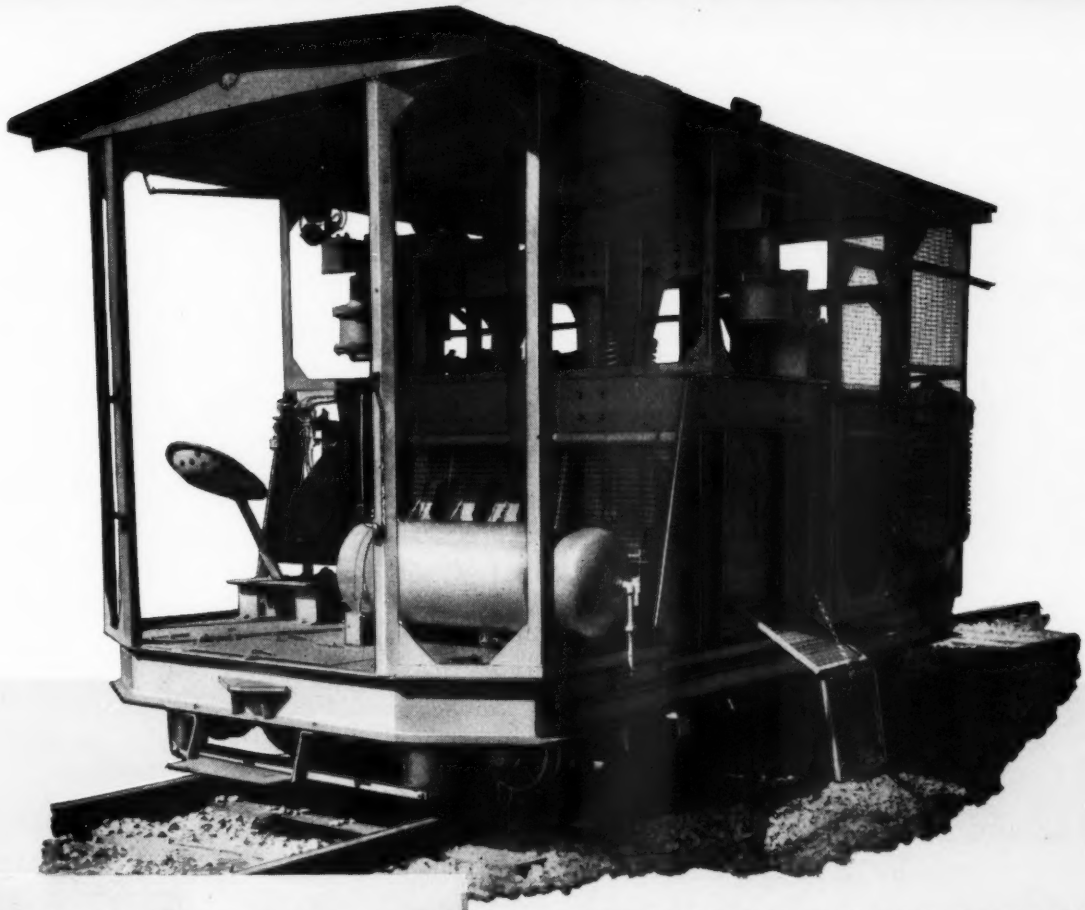
These economies are *facts of record*, in instance after instance. They are worthy of the most careful consideration in any railroad's current budget planning.

FOUR WAYS TO BUY

The Pullman-Standard Power Cribber is available in any of the following ways:

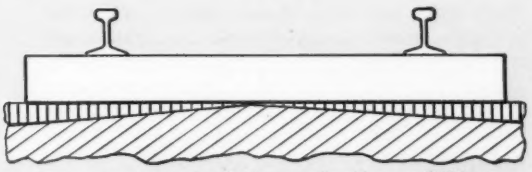
1. **Outright purchase.**
2. **Rental for three months, with option to buy.**
3. **Straight rental for a minimum period of 3 months.**
4. **Deferred quarterly payments over a period of 1 to 3 years.**

Further information will be promptly supplied.



Powered by a 100-h.p. gasoline or Diesel engine, the Pullman-Standard Power Track Cribber travels to and from location at a speed of 25 miles per hour. Power-operated jacks and transverse wheels permit complete setoff in from three to five minutes.

Railroads operating Pullman-Standard Power Track Cribbers think in terms of *mileage* instead of footage. Typical performance—1.8 cribs per minute.



To restore proper drainage, the Power Cribber cuts a uniform sloping profile between the ties, level with the tie base at the track center and 3½ inches lower at the tie ends.

Action photo! A free-moving, 7,200-pound drophead drives these digger bars into the crib with "pile driver" impact, as cam action forces the bars outward, thus quickly loosening the ballast and clearing the crib.

POWER BALLASTER PRODUCTS DIVISION

Pullman-Standard

CAR MANUFACTURING COMPANY

79 East Adams Street, Chicago 3, Illinois

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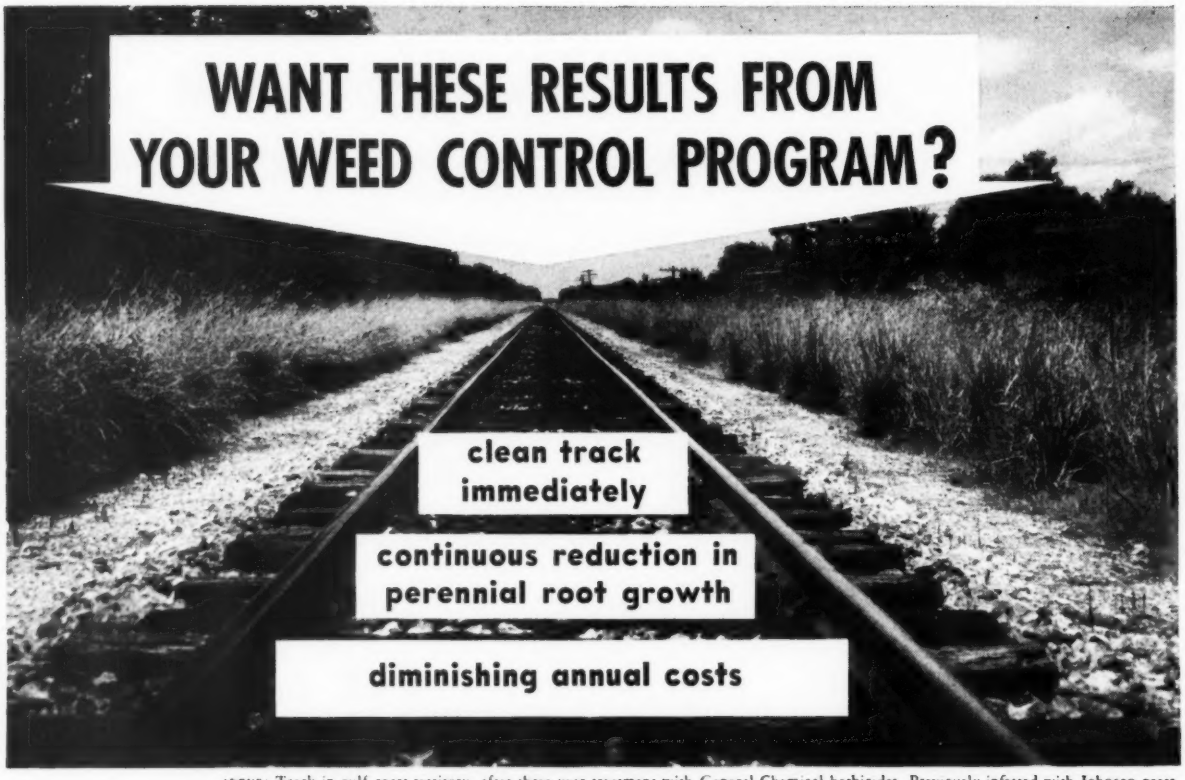
WASHINGTON 6, D. C., 1025 Connecticut Ave., N. W.
SAN FRANCISCO 4, 2910 Russ Building

CANADA: The Holden Co., Ltd. • Montreal 3, 614 St. James St. W.
Toronto, 128 Simcoe St. • Winnipeg, 150 Princess St. • Vancouver, 769 Powell St.



ABOVE: Track in gulf coast territory, after three year treatment with General Chemical herbicides. Previously infested with Johnson grass, Bermuda grass, Trumpet vine and Saw Briar, it now requires only marginal treatment to maintain clean sub-grade and top ballast.

Your Policy Decision *Today* Will Determine Your Weed Control Cost 3-5 Years From Now!

Do you want temporary top-kill . . . with no reduction in yearly costs?

or

Cumulative control with clean track . . . at higher initial cost but diminishing annual expenditures?

The choice is yours!

Modern weed control programs must provide over-all efficiency and long-term economy to justify their use. Unfortunately, with burning and most forms of chemical control, only *seasonal relief* is obtained . . . and costs remain at the same high level year after year! Such practices only result in *temporary* top kill . . . root structures are not destroyed; regrowth is rapid; seed germination is not suppressed.

A Two to Three Year Tailor-Made Program to Maintain Weed-Free Ballast

Out of its extensive background in handling individual railroad weed problems, General Chemical has developed a modern method of control which now enables a road to achieve *clean track immediately* . . . with *continuous reduction in root growth,* coupled with *diminishing costs!*

Such results are obtained by a two or three year program following a schedule especially tailored to overcome each road's particular weed problems.

Cumulative Results With Long-Range Economy!

Aimed at control of perennial *root systems,* General's scientific method assures killing off of long established perennials; continually reducing amount of regrowth year after year; eliminating heavy seed germination; and preventing outside encroachment in subgrade. With this thorough method, your track can be *maintained* in a relatively weed-free condition with minimum dosages!

While initial costs may be somewhat greater than for temporary annual relief, such a high level of continuing control is achieved that the over-all long-range costs are far less and lead to increased savings. *The end result is track which can be kept weed-free year after year with the smallest possible budget.*

GENERAL CHEMICAL WEED CONTROL

Write today for full details to:

Weed Killer Department

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

Products Index

A

Acetylene ---------- 10
Adzing Machines ---------- 31, 40
Air Compressors ---------- 66, 79
Air Cooled Engines ---------- 77
Air Dump Cars ---------- 80
Aluminum ---------- 11
Aluminum Jacks ---------- 81
Aluminum Sheets ---------- 11
Anchors ---------- 1, 13

B

Ballast Cleaners ---------- 24, 25, 31
Ballast Cleaning Service ---------- 72
Ballast Renovation Cars ---------- 34
Bearings, Roller ---------- 19
Blowers ---------- 71
Bolts ---------- 79
Bond Drills ---------- 4
Bridge Ties, Treated ---------- 16, 17
Brush Killers ---------- 14, 33
Brush Killing Service ---------- 14
Buildings, Steel ---------- 22

C

Car Power Plants ---------- 65
Car Stops ---------- 81
Carbide ---------- 10
Cars ---------- 80
Chain Saws ---------- 41, 71, 79
Chemicals 9, 14, 26, 33, 67, 73, 76
Clean Preservatives ---------- 9
Cranes ---------- 5, 12, 51, 74, 78, 79
Crawler Cranes ---------- 5
Crawler Tractors ---------- 15, 20, 21
Creosote ---------- 16, 17
Crib Cleaners ---------- 79
Cribbing Machines ---------- 24, 25, 31
Crossties, Treated ---------- 16, 17

D

Diesel-Electric Locomotives ---------- 65
Diesel Engines ---------- 8, 15
Drills ---------- 52, 64, 75
Drills, Track Power ---------- 75

E

Earthmoving Equipment ---------- 8, 15, 64, 80
Electric Chain Saws ---------- 71
Electric Heaters ---------- 65
Electric Locomotives ---------- 65
Electric Plants ---------- 79
Electric Tie Tampers ---------- 6, 7
Electric Tools ---------- 79
Electric Welding Supplies ---------- 10
Electrodes ---------- 10
Emulsified Asphalt ---------- 84
Engines ---------- 77

F

Fastening Tools ---------- 52
Flame Hardening ---------- 36
Flangeway Cleaners ---------- 18
Floor Surfacings ---------- 81

G

Gasoline Engines ---------- 77
Generators ---------- 71, 79
Grease ---------- 84
Grouting Equipment ---------- 39
Guard Rail Bolts ---------- 79

H

Herbicides ---------- 14, 33, 67, 76
Hydraulic Jacks ---------- 81

I

Impactors ---------- 79

J

Jacks ---------- 31, 70, 81

L

Lag Screws ---------- 79
Lever Jacks ---------- 81

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Lighting Systems----65
Locomotive Cranes----12, 78

M

Motor Cars----18, 34
Motor Graders----15
Motors ----65

O

On-Track Tampers----24, 25
Oxyacetylene Equipment----10
Oxyacetylene Service----36
Oxyacetylene Welding Supplies ----10
Oxygen ----10

P

Piles, Treated----16, 17
Platform Surfacings----81
Power Distribution Systems----65
Power Track Drills----75
Power Units---- 8
Prefabricated Buildings----22
Preservatives ----16, 17
Pumps ----71, 81

R

Rail Anchors----1, 13
Rail Benders ----75
Rail Drills ----4, 31
Rail Joint Oilers----18
Rail Layers----42
Rail Laying Cranes----74, 78, 79
Rail Saws---- 4
Rail Testing Service----23
Roller Bearings----19
Rotary Pumps----81

S

Saws ----4, 71
Screw Jacks----81
Sheeting ----22
Snow Melters----65
Sprayers ----18, 79
Spring Washers----2, 83
Steel ----3
Surfacing Jacks----70
Sweepers ----63, 66
Switch Heaters ----65

T

Tampers----4, 6, 7, 24, 25, 39, 48
Tapered Roller Bearings----19
Testing Equipment----65
Tie Cutters----18
Tie Plate Spacers----18
Tie Tampers--4, 6, 7, 24, 25, 39, 48
Ties, Treated----16, 17
Timber Bolts----79
Timbers, Treated----16, 17
Track Drills, Power----75
Track Jacks----31, 70, 81
Track Wrenches----31
Tractor Attachments----54
Tractors---8, 15, 20, 21, 54, 63, 64
Truck Cranes----5, 74
Trucks ----40

U

Unit Tie Tampers---- 4

W

Washers ----2, 83
Weed Burners----18
Weed Killers 14, 26, 33, 67, 73, 76
Weed Killing Service 14, 67, 73, 76
Welding Apparatus----10
Well Water Systems----80
Wheel Tractors ---- 8
Wood Preservatives---9, 16, 17, 66
Wrenches ----31

Y

Yard Cleaners----31

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Henry E. Michael
ASSOCIATE EDITOR

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ASSOCIATE EDITOR

Norris V. Engman
ASSOCIATE EDITOR

No. 265 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION
79 W. MONROE STREET
CHICAGO 3, ILL.

Subject: Our Large Staff

January 1, 1951

Dear Readers:

What is your opinion as to the number of persons comprising the editorial staff of this magazine? Of course, you will say, there are four men on the staff, as anyone can find out for himself by turning to the contents page. But after I explain the editorial organization of the Simmons-Boardman railway papers as a whole I am sure you will agree that our editorial staff is actually much larger than it appears to be.

Four railway magazines are published by this company, each serving a different category of railway readers. Edited primarily for management personnel, department heads, and railway men in the upper echelons generally, is the Railway Age, a weekly. Then there are three departmental monthlies—Railway Mechanical and Electrical Engineer, Railway Signaling and Communications, and Railway Engineering and Maintenance. The editors of these four magazines, comprising a total of 25 men, form an interlocking group in that all of them spend at least part of their time working for the Railway Age. For instance, the editorial staff of Maintenance comprises the Engineering Department of the Railway Age.

These 25 editors have much in common. They are nearly all essentially railroad men, with practical railroad experience, and they all work for four railway magazines published by the same firm. This situation naturally leads to much discussion, in and out of the office, of railway matters in general, including the exchange of ideas and information. Such discussions derive partly from the mutual interest of the group in railroading as a whole, and partly from a calculated policy of co-operation in promoting the interests of the several railway magazines.

We of the staff of Maintenance benefit from this relationship in several ways. First, it helps us to keep abreast of developments in those departments of railroading outside of the one in which we are particularly interested. Second, leads and ideas for articles are obtained that might not otherwise come to our attention. I would like to explain this last point a little more fully. In spite of the best efforts of the four regular editors of this magazine we can't be everywhere and see everything that happens of interest to us and our readers. Recognizing this fact the other 21 Simmons-Boardman railway editors, in making their rounds of the railway industry, are alert for developments of interest to maintenance people, and are continually feeding them to us in letters and by word of mouth.

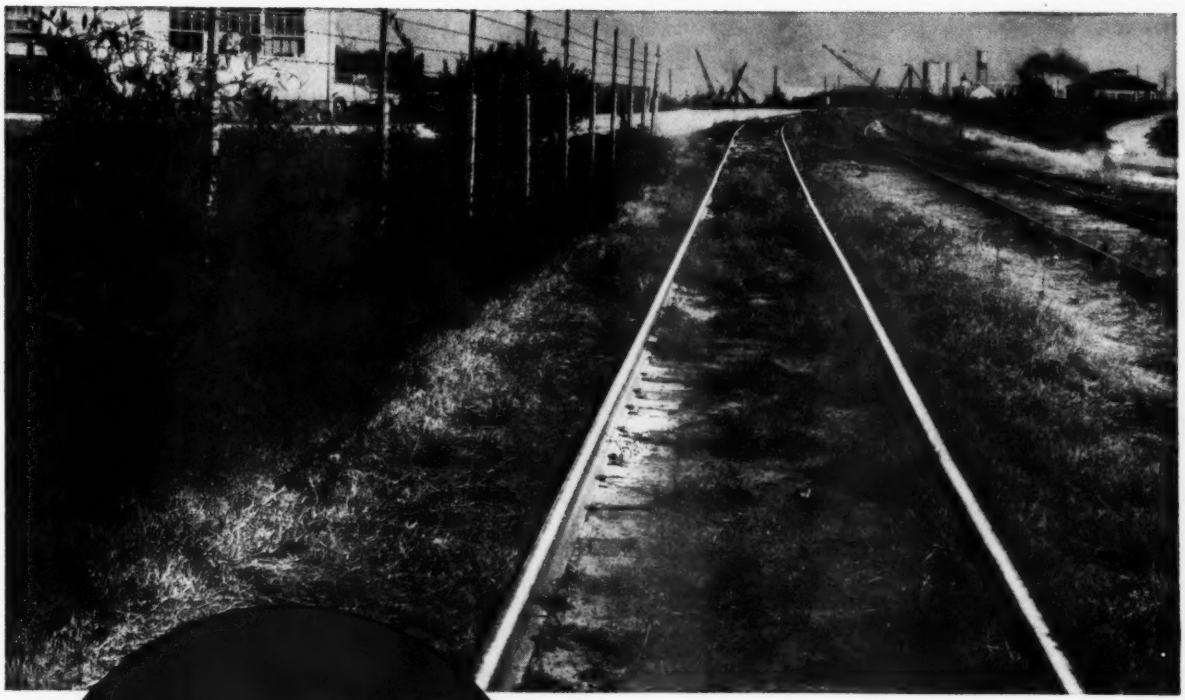
So you see that, as readers of this magazine, you are benefiting by the efforts of a much larger group of editors than those whose names appear on the contents page. We feel that the help given us by our associates makes it possible for us to render a better service to you than would be possible if we had to rely entirely on our own efforts, observations and ideas.

Yours sincerely,

Merwin H. Dick

MHD:ag

Editor



It costs less

to keep out unwanted growth with Chapman Chemicals

WHAT'S YOUR PROBLEM?

■ New chemical developments make it possible for railroads to maintain a clear right-of-way and clean track-ballast and trestle areas with less labor and at far less cost than by methods formerly used.

For clean track ballast area, spray with Sodium TCA. It kills foliage and roots of such perennials as Johnson, Bermuda, Quack, and Blue grasses. In areas where only control of grass foliage is desired, use Penta Weed Killer . . . the cheapest and most effective contact herbicide.

For clear right-of-way, use Chapman Brush Killer. It effectively controls weeds, vines, brambles, and other woody growth, without killing grasses.

For bare ground under trestles, use Borascu to sterilize the soil and stop all growth. It is non-poisonous and non-combustible. One application may last two years or longer.

The great variety of plant life, climatic conditions and soil types make it impossible to offer any one chemical prescription for all weed killing problems. We will be glad to give you recommendations applying to your problems.

CHAPMAN CHEMICAL COMPANY
Dermon Building, Memphis 3, Tenn.

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Weed Killers

SODIUM TCA • CHAPMAN BRUSH KILLER • PENTA GENERAL WEED KILLER • BORASCU

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RAILWAY MOTOR CARS
AND WORK EQUIPMENT

. . . broadening the range of maintenance equipment

One of Fairmont's greatest contributions to railway maintenance has been the consolidation of smaller maintenance tasks into larger single operations. And perhaps the finest example of this is the Fairmont W77 Ballast Maintenance Car. By mounting scarifiers, discs, ballast equalizing boxes, two sizes of blades and a center plow, this remarkable car performs ballast maintenance operations quickly and efficiently. Even greater versatility is afforded by its two-way, four-wheel drive. Power is furnished by a 112 h.p. gasoline engine through four-speed transmission with hydraulic coupling. Through brilliant performance on the job, Fairmont's W77 Ballast Maintenance Car has proved indispensable wherever efficient, economical maintenance is a requisite.

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Editorials ---- 37
The M/W Ratio—1950 in Review

Railways Spent $18,270,000 for Work Equipment in 1950 ---- 39
A report on the number of power machines and tools purchased during the past year by the roads of the United States and Canada

Suburban Track Gets "Ribbonrail" ---- 42
Tells how the Chicago & North Western transported, unloaded and installed 10½ track miles of pressure-welded rail

Sliding Forms Shoot Pier Shafts Skyward ---- 45
Ralph Holt describes the procedure used in concreting the substructure for a new bridge of the Southern over the Cumberland river

Power Ballasting As It Is Done on the Erie ---- 48
Division Engineer Arthur Price discusses the gang organization, procedure, operating costs and quality of the work

Burro Crane with Long Boom Speeds Laying of 78-Ft. Rails ---- 51
Describes the effective performance on the Pennsylvania near Hamlet, Ind., of a new machine in use for the first time

Electrical Fixtures Placed with Special Tools ---- 52
A report on the use of carbide-tipped drills and powder-actuated tools for inserting fastenings in concrete and steel

Two-Man Work Train Cuts Costs on the S. P. & S. ---- 54
Describes a completely self-contained outfit built up around a Caterpillar D6 tractor equipped with a Hystaway attachment

Something Different in Yard Offices ---- 56
Describes a structure on the Kansas City Southern in which appearance as well as utility was emphasized in its design

What's the Answer? ---- 57
Testing Level Boards and Gages
Protection of Deep-Well Pumps
Removing Ashes from Station Basements
Feeding Snow-Fighting Forces
Steel Caps in Wood Pile Trestles
Laying Rail with Two Cranes

Products of Manufacturers ---- 63

The Month's News ---- 68

MERWIN H. DICK
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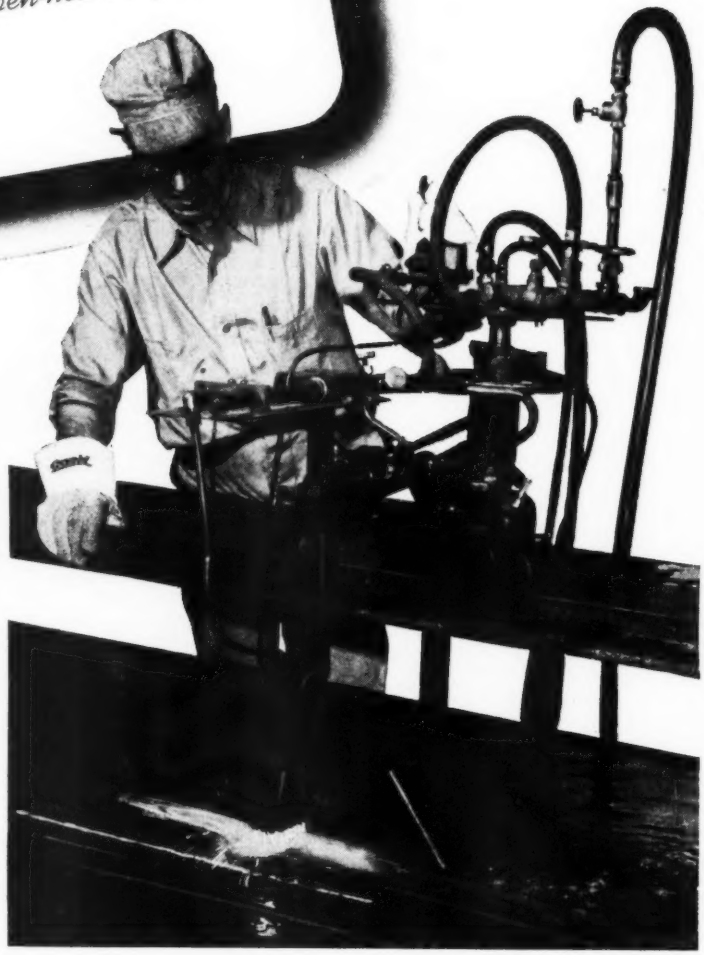
Major savings in track maintenance costs are being made by many railroads that have flame-hardened open-hearth frogs and crossings.



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The M/W Ratio —

Does It Have To Be So High?

The men who are in charge of maintaining the tracks and structures of the American railroads have much to be proud of. They can point to the important strides that have been made in putting greater permanence into the structures, especially the tracks, and they can call attention to the progress made in promoting the efficiency of the work gangs under their supervision.

While these men have every right to be proud of their accomplishments they would be the first to admit that there is still much to be done. The most convincing evidence available of the truth of this statment is the relatively high proportion of total railway revenues that is now being spent for the maintenance of the tracks and structures. For the first nine months of 1950 the maintenance ratio for the Class I railroads as a whole was 14.1. This means that it is holding at about the same level that has prevailed since the upward spiral of wages and prices started during World War II. At this level the ratio is far out of line from what was considered normal in the pre-war years. At that time it was hovering in the vicinity of 11 or 12 for the Class I roads. In fact, for the ten years ending with 1944 the average ratio was 11.7.

So many factors are involved in determining the ratio of maintenance-of-way expenses to total revenues that it would be difficult to analyze in specific terms the reasons for the increase that has occurred. Unquestionably, however, the relatively greater increase in the cost of labor and materials as compared with freight rates has been the most important single factor in causing maintenance expenses to move up faster than revenues.

Whatever the reason, the unpleasant truth remains that, in relationship to revenues, maintenance expenses are out of line with what they were before the war. The easy way out is to argue that this is so because of factors beyond the control of maintenance officers. To take this position would be the same as assuming that the higher maintenance ratio is here to stay and that there is very little hope of getting it back to its former level. This is a dangerous viewpoint to take because it rules out the possibility of effecting any substantial improvement in the efficiency of the maintenance forces.

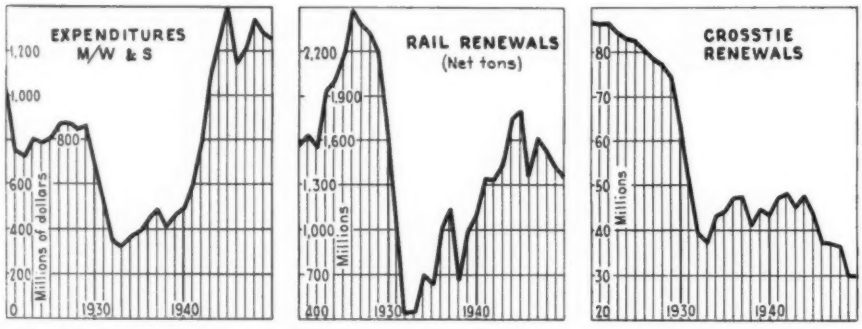
Obviously, the problem of getting the maintenance ratio under control must be considered from the standpoint of each individual road. Some roads have ratios that hover consistently in the neighborhood of 10 or 11, while on others it is just as consistently up around 20 or even higher. The high-ratio roads might find it profitable to examine the maintenance practices on those lines with lower figures.

Possibly it will be found that, to some extent at least, the apparent better performance of the maintenance forces on the low-ratio roads is due to inherent factors having nothing to do with the efficiency or effectiveness of these forces. On the other hand it is just as likely that superior maintenance practices may be in effect, which contribute to the low ratios. Wider adoption of these superior practices would undoubtedly help to bring the average ratio for all roads back to the level that prevailed before the war.

1950 IN REVIEW—

And an Appraisal of the New Year

DURING the first seven months of 1950 the expenditures of the Class I roads for the maintenance of their tracks and structures were on a somewhat curtailed basis, as they had been since the 40-hr. week went into effect on September 1, 1949. However, the closing months of 1950 saw a substantial pickup in these expenditures, with the result that the twelve-month total is estimated to be slightly above that for the previous year. Specifically, based on the actual expenditures for the first nine months of the year, the total maintenance-of-way expenditures for 1950 were approximately $1,300 million, an increase of 1.4 per cent as compared with 1949. What is more important, however, is the fact that, while maintenance expenditures were on a declining scale at the beginning of 1950, they are on a rising scale as the new year begins.



Charts show 30-yr. record of M/W activities for Class I roads (1950 figures estimated)

The amount of new rail laid in replacement and the number of ties renewed in 1950 showed little change as compared with 1949. Based on information furnished to this magazine by most of the Class I roads it is estimated that these roads as a whole laid 1,360,000 net tons of new rail in 1950, a decrease of 5.1 per cent as compared with the previous year.

On the same basis it is estimated that the Class I roads inserted 29,950,000 ties in renewals in 1950, a drop of 1.1 per cent as compared with 1949. Tie renewals were thus brought to a new all-time low for the third consecutive year. This situation may be partly attributed to the increased tie life being obtained as the result of the general practice of treating ties against decay and partly to the fact that the unfavorable economic conditions that prevailed during the early part of 1950 caused roads to reduce the number of tie renewals below what would have been justified had the condition of the properties been the primary consideration.

While the year 1950 was uneventful in that there were no wide fluctuations in the activities of the maintenance forces as compared with the previous year, what about 1951? It is generally assumed that, due to the mobilization program, railroad business is going to be on a higher level. A logical assumption, therefore, is that maintenance programs will be correspondingly higher. Not only will there be more wear and tear on the properties to be made good, but presumably at least some roads will have more money to spend.

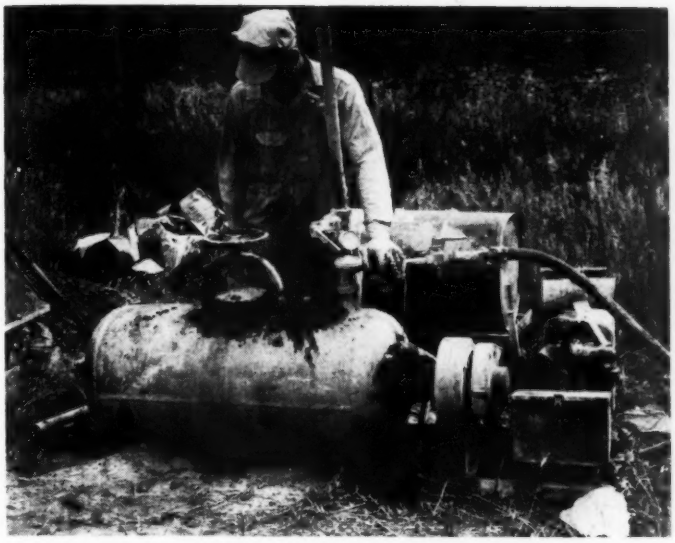
However, in predicting greater maintenance activity this year there is something more to go on than mere conjecture. As part of a survey to determine the outlook for 1951 this magazine obtained information from a large number of Class I roads regarding the magnitude of their proposed rail and tie-renewal programs. On the basis of this information it is estimated that these roads as a whole are planning to lay 1,580,000 net tons of new rail in 1951, an increase of 16.1 per cent compared with 1950. On the same basis it is estimated that these roads are planning to insert 32,800,000 crossties, an increase of 9.5 per cent over the previous year.

Whether it will be possible to carry out these enlarged programs is a problem that must be faced squarely. Unquestionably steel will be in short supply. Also, since crosstie production in 1950 was at an extremely low level, it is doubtful if the supply this year will be sufficient to permit much of an expansion in tie-renewal programs. And overhanging the whole picture will be a shortage of manpower that threatens to hamper maintenance activities unless effective countermeasures are taken. Thus, history will be repeating itself in the respect that, as during World War II, there will be serious problems to be overcome in carrying out the enlarged programs that are planned for 1951. The amount of ingenuity and leadership displayed by maintenance men of all ranks will determine the degree to which they will be successful in discharging the heavier responsibilities that will be theirs in the fateful year now dawning.

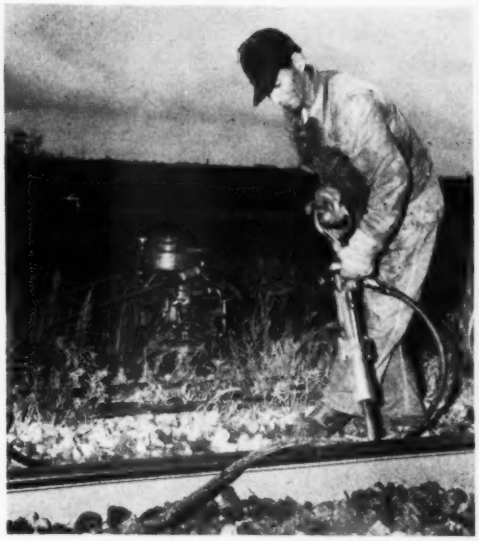
ANNUAL INDEX—

How to Obtain Your Copy

THE INDEX of all material published in *Railway Engineering and Maintenance* during 1950 will soon be ready. Those who have requested copies of the annual index in previous years will automatically have one mailed to them this year. If you have not requested a copy of the index in any prior year, but desire to have a copy of the 1950 index, all you need to do is fill out and mail the coupon included on page 35 of this issue.



Substantially increased in 1950 were the purchases of grouting outfits . . .



and of pneumatic and electric tie-tamping outfits

Railways Spent $18,270,000 For Work Equipment in 1950

Reported purchases of power machines and tools, measured by number of units acquired, were about the same as 1949. Substantially larger buying programs are under consideration for this year

Purchases in 1950 reflected continuance of the trend toward use of on-track tampers

• In 1950 the railroads of the United States and Canada purchased about 8,700 units of work equipment for the use of the maintenance of way and structures forces. For this equipment they spent about $18,270,000. The number of units purchased was about the same as for 1949, but because of increased prices the dollar value was $750,000 larger. While the number of units purchased was somewhat below the figures for each of the years 1944 to 1948, inclusive, it was higher than for any year prior to 1944. On the other hand the dollar value of the 1950 purchases has been exceeded only twice before—in 1947 and again in 1948.

Source of Information

The figure showing the number of units of work equipment purchased in 1950 is an estimate based on answers to a questionnaire sent to all railways of the United States and Canada. Replies were received from about 80 per cent of the roads of these two countries, including all but a few of the more important lines. Of the roads submitting replies, 159 reported the

There was a substantial increase in purchases of equipment for rail-laying gangs

purchase of work equipment totaling 7,901 units. In 1949, 178 roads reported purchases of work equipment totaling 8,114 units. Of the Class I roads reporting in 1950, 53 acquired more equipment than in 1949, and 38 reported fewer purchases. A large share of the other reporting roads purchased about the same amount of equipment as in the previous year—seven of them, in fact, reporting identical purchases for the two years.

Next Year To Be Better

In view of the advent of the 40-hr. week on September, 1949, with the accompanying sharp increase in hourly wages of M/W employees, it would have been logical to expect a sharp upturn in the volume of work equipment purchases in 1950 as one means of getting the maximum output per man-hour. But the uncertain business conditions that prevailed during the first half of the year had a definite dampening effect on the railroads' plans to buy more equipment. However, along with the improvement in business conditions that occurred in the later months of the year, there was a marked revival of interest in obtaining additional maintenance-of-way machines, and this interest is certain to carry over into this year, with tangible results for the manufacturer.

There is a solid basis for the belief that work-equipment purchases will show a sharp upturn this year, providing, of course, that the manufacturers are able to obtain the necessary materials. Sixty railroads have provided this magazine with dollar estimates of the amount of work equipment they plan to buy in 1951. Of these roads, 38 expect to spend more money for this purpose than in 1950, while 22 reported that they would spend less. Specifically, the planned purchases of work equipment of these 60 roads as a group will amount to $6,943,669, an increase of $1,915,266, or 38 per cent, compared with 1950. If past experience is any criterion there is a strong possibility that the actual purchases of these roads will be even larger than the estimated figure.

Ballasting Machines Tops

As in 1949, machines used in carrying out ballasting and surfacing programs outranked all other categories of equipment, measured by the number of units purchased. To be specific, the reporting railroads acquired 1325 machines in this category in 1950. While this represents a rather sharp drop from the 1899 units that were reported purchased in 1949, it is interesting to note that increases occurred in several individual types of tamping equipment. For instance a continuance of the trend toward the use of large on-track tampers is reflected in the fact that the purchase of 79 units of this type was reported, compared with 56 in 1949 and 50 in 1948.

Rather paradoxically, in spite of the seeming preoccupation of maintenance men with large tamping machines, there was a substantial increase in 1950 in the reported purchases of pneumatic and electric tie-tamping outfits. These purchases included 218 complete pneumatic outfits, including the compressors, and 244 electric outfits, including the generators—a total of 462 outfits. The reported purchases of such equipment in 1949 included 184 pneumatic and 202 electric outfits, a total of 386. Other reported purchases of bal-

Purchases last year reflected continuance of the trend toward greater use of trucks

lasting and surfacing equipment in 1950 included 699 tamping tools, 37 power jacks, and 26 ballast diskers.

Although the number of motor cars purchased showed a decline in 1950, this classification still ranked second, measured by the number of units purchased. The 159 roads reporting the purchase of work equipment last year bought in that year a total of 1,229 motor cars. This figure represented a moderate decrease from the 1,462 units reported purchased in 1949 by 178 roads. Similarly, the reported purchases of push cars and trailers declined from 847 in 1949 to 602 last year, and the number of hand cars acquired dropped from 66 to 51.

Highway Vehicles Up

Reflecting a continuance of the trend that has been in evidence for several years toward the use of trucks and related equipment for transporting men and materials there was a further increase in the amount of such equipment purchased last year. These purchases included 198 automobiles, 897 trucks, and 68 trailers, a total of 1,157 units. In 1949 the reporting railroads acquired 173 automobiles, 737 trucks, and 21 trailers, a total of 931 units.

In view of the fact that the amount of new rail laid in 1950 fell slightly below the previous year, it comes as something of a surprise to note that there was a rather substantial increase in the purchase of equipment acquired especially for this purpose. To be specific the total units acquired in this category, in 1950 came to 713 machines, compared with 572 in the previous year. Most of the different types of equipment in this category shared in the increase, including adzing machines, bolting machines, cribbing machines, spike drivers, spike pullers and power rail layers. Declines occurred in the reported purchases of rail cranes, rail and bonding drills, and rail saws.

Grading equipment was another category of machines of which increased purchases were reported. The reporting railroads said they bought a total of 300 units of such equipment last year. This compares with reported purchases of 259 such units in 1949. Worthy of particular mention are rather substantial increases that occurred in the purchase of dragline buckets, bulldozers, and motor graders. Eight spreader-ditchers were reported bought last year, as against 9 in 1949.

More Cranes Bought

A moderate increase occurred in the reported purchases of cranes—from 74 in 1949 to 80 in 1950. Bright spots in the crane picture were afforded by an increase in number of locomotive cranes acquired from 11 in 1949 to 18 in 1950, and in the number of crawler cranes from 15 to 25. The figure on crane purchases does not include draglines and shovels, which are incorporated in the purchases of grading equipment mentioned above. Reported purchases of derrick cars dropped from 52 in 1949 to 45 last year.

Power Plants in Demand

As already noted, the tie-tamping outfits purchased in 1950 all include the power plants necessary for their operation. In addition, the railroads reported the purchase of a considerable number of power plants to replace worn-out units and to supply power for the operation of additional power tools purchased for use in bridge and building work. The reporting railroads bought a total of 226 power plants last year, including 91 air compressors and 135 generators. Reported purchases of these items in 1949 were 88 air compressors and 130 generators, a total of 218. Rather surprisingly, there was a substantial increase in the number of motor car engines purchased—from 75 in 1949 to 135 in 1950.

Tools For B. & B. Forces

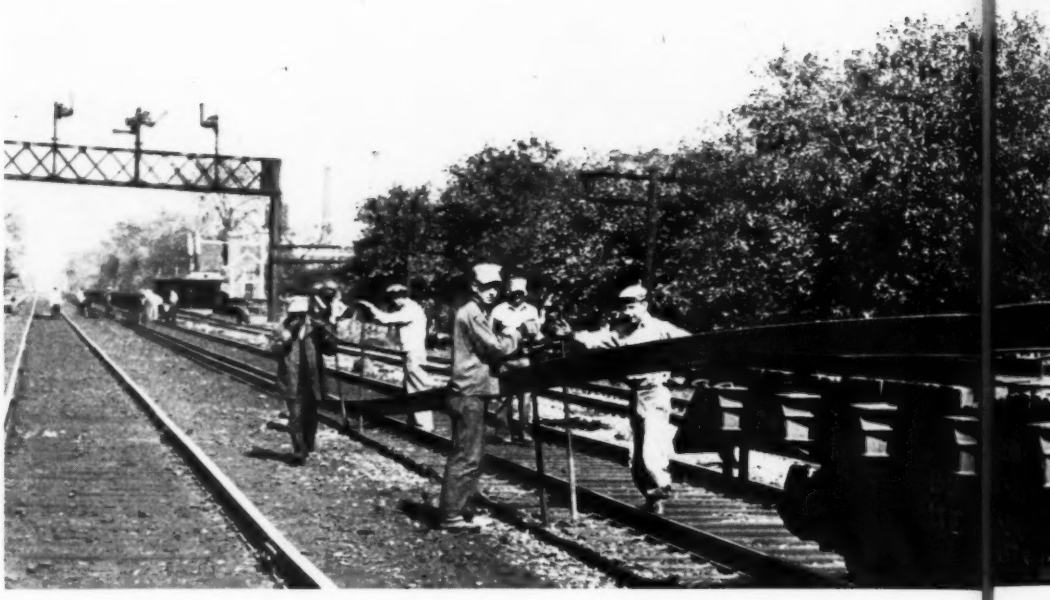
Reported increases in the purchase of several categories of relatively small power tools are indicative of the fact that the railroads are not neglecting the mechanization of their bridge and building forces. Most pronounced in this respect was an increase in the reported purchases of timber saws from 195 in 1949 to 232 in 1950. Impact wrenches went up from 111 to 122, and power wrenches from 6 to 41. Wood borers went down from 60 to 43.

Miscellaneous Equipment

It is interesting to note that a substantial increase occurred in the reported purchases of rail and flange lubricators. These purchases totaled 265 in 1950, compared with 144 in 1949. Other classifications of equipment reported purchased in 1950 included concrete mixers, grouting outfits, hoists, mowing machines, paint spray outfits, paving breakers, portable pumps, rollers or impactors, tie cutters, tie borers, weed burners, welding outfits, and yard-cleaning machines. The reported purchases of miscellaneous machines came to 541 units, compared with 288 in 1949.

The reported purchases of timber saws increased from 195 in 1949 to 232 in 1950

Above—J. P. Datesman, engineer of track, who was in direct charge of the work



Right—Unloading a long rail was accomplished by fastening one end to the track and pulling cars from underneath

Suburban Track Gets

The North Western recently completed its biggest continuous rail project—the installation of 10½ track-miles of 115-lb. pressure-welded rail in Chicago suburban territory. This article describes the project in detail, telling how the rail was transported, unloaded, and laid with the aid of two Meco rail layers

• Anticipating reduced maintenance costs and smoother-riding track, the Chicago & North Western has relaid 10½ track-miles of 100-lb. and 110-lb. rail in the high-speed center track of the three-track main line extending between its Clybourn station in Chicago and Wilmette, Ill., with 115-lb. continuous welded rail. Using an Oxweld pressure-welding machine, the road fabricated 39-ft. rails into various length ranging from 546 ft. to 741 ft. at West Chicago, transported them 16 at a time on specially-equipped flat cars to the unloading site, and laid them with the aid of two Meco power rail layers.

The flat cars (two 17-car sets) on which the rails were hauled were prepared for this service by fastening transversely across each deck two lengths of scrap rail, one at each quarter point, to act as bearings for the load. One end of each skid rail was bent down to fit into a stake pocket of the car, and the other end was bolted to the deck. Near the latter end a rectangular notch about 8 in. long and 3 in. deep was cut out of the rail, and a roller, somewhat longer than the notch, was bolted to the flange of the rail alongside the notch, with its bearing surface protruding above the bottom of the notch.

At the welding plant at West Chicago 16 parallel lines of rail were loaded onto a string of 17 of these cars by a crawler crane operating on a roadway running parallel with the cars. While en route all the long rails rested on the bearing rails; none were carried on the rollers. Blocking and car stakes were used to control lateral and longitudinal movement. A work train pulled the cars from West Chicago to Proviso, where they were picked up by a switch run and taken to Fortieth street, Chicago. From there another work train handled them to the unloading site.

In the unloading procedure the length of rail nearest the notches was first barred into them and onto the rollers. Next, one end of this rail was secured to the track by a ⅝-in. cable, 20 ft. long, and the cars slowly pulled from underneath the rail, which was deposited on the roadbed near the ends of the ties. Another rail was then barred onto the rollers and the procedure repeated. Since the entire load on each string of cars could thus be unloaded on only one side of the track at a time, and since rail for one side only was handled on any one trip, an intricate movement schedule of both loads and empties was worked out in advance, which provided for turning the cars on a wye as necessary to complete the unloading on both sides.

The actual laying operation was carried out by a specially-organized rail-laying gang of 80 men employing an oxyacetylene bolt-cutting outfit; two spike pullers; a rail crane running backwards, which picked up the old rails and placed them outside the unloaded welded rail; an adzing machine; the two Meco power rail layers; another crane for bumping the long rail forward as necessary; and three spike hammers. While the work was in progress the track was taken out of operation. However,

"Ribbonrail"

only about five hours daily of laying time was available, as the track had to be kept in service for the heavy suburban traffic in the morning and put back into service again in time to handle the outbound traffic in the late afternoon.

In laying the long rails the two Meco machines played an important role. Previously these machines had been used successfully on this road for installing 78-ft. and 117-ft. rails. Briefly, the Meco power rail layer consists of a fixed boom mounted on a frame with two double-flanged wheels on one side, which run on one of the track rails, and a crawler mechanism on the other side, which runs on the ties. Lifting is accomplished by a chain hoist threaded through a hoisting carriage which runs up and down the boom. The initial lift is made with the hoisting carriage at the top of the boom. Released by a trip mechanism, the carriage then runs down the boom to a stop position, carrying the rail to a position over the tie plates. A more

Working 39 ft. apart, these two Meco power rail layers progressively placed each long rail in its proper position

detailed description of this machine was published in the June, 1950, issue of *Railway Engineering and Maintenance* as part of an article describing its use in laying 78-ft. rails.

The crew required for installing the long rails with the two machines consisted of four men—an operator and a man to handle the rail tongs at each machine. The two units were worked a rail length (39 ft.) apart. The hoisting carriage of the leading machine was run to the top of the boom before each lift was made, but that of the trailing machine was always kept at the bottom of the boom.

After a section of the long rail was lifted by the two machines, the tongs man of the leading machine struck the carriage trip of his machine. Thus released, the hoisting carriage rolled down to the stop position, causing the part of the rail suspended by the leading machine to move inward to a position just outside the tie plates. At the same time the inward movement of the rail at this point caused the part of the rail suspended by the rear machine to move to a position directly over the tie plates. The rail was then lowered and the machines moved forward a rail length to take another bite on the rail.

After a long rail had been placed in position it was usually necessary to move it longitudinally to provide the proper gap for field welding it to the preceding rail. If the rail had to be moved forward it was bumped the necessary distance by a rail suspended by the crane operating at the rear of the long rail, as already mentioned. If the long rail had to be driven backward this was done by bumping it with a rail suspended by the forward crane or by the two Meco machines.

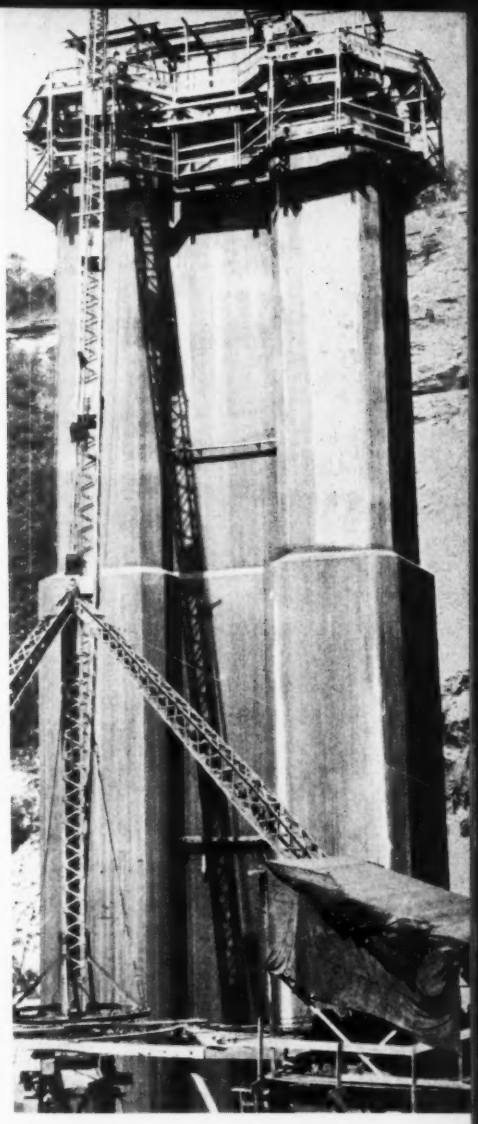
The rail-laying work described in this article was carried out under the general direction of E. C. Vandenburgh, chief engineer of the North Western, and L. R. Lamport, engineer of maintenance. In direct charge in the field was J. P. Datesman, engineer of track, assisted by W. H. Huffman, division engineer, and E. A. White, roadmaster.

Left—This crane, running backward, picked up the old rails and placed them outside the unloaded welded rail. Below —After a section of the long rail was lifted by the two machines, the tongs man of the leading machine struck the carriage trip of his machine. Thus released, the hoisting carriage rolled down the boom, pulling the long rail inward

Sliding Forms Shoot Pier Shafts Skyward

By RALPH HOLT
Resident Engineer, Modjeski and Masters
Harrisburg, Pa.

The use of relatively low forms which could be jacked upward at the same rate that concrete was poured into them proved practical and economical in the construction of tall pier shafts, one 204 ft. high, for a new bridge of the Southern over the Cumberland river at Burnside, Ky. In this article Mr. Holt describes the construction of the forms, the raising procedure, and the methods used in placing and finishing the concrete.



Concreting Pier 2 by slip-form method. Close supervision and inspection kept alinement within very accurate limits

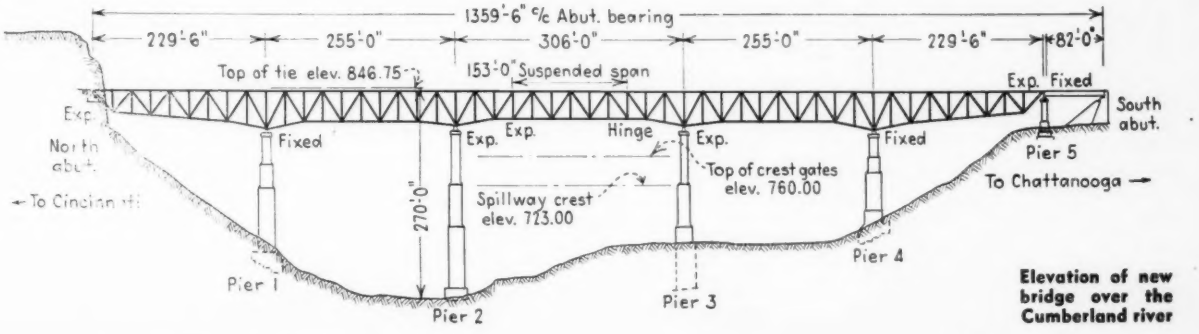
• The economic advantages of using slip forms instead of fixed forms in concreting tall pier shafts when form-lumber costs are high was demonstrated on a recent project on the Southern, involving the construction of a large double-track bridge across the Cumberland river at Burnside, Ky. The new bridge—a deck-truss cantilever structure founded on two abutments and five piers—replaces a single-track bridge located about 1,425 ft. downstream, and was required, along with the relocation of several miles of track, because of the construction of the new Wolf Creek Dam and Reservoir Project by the Corps of Engineers, U. S. Army.

In designing the Burnside bridge, consideration was given from the start to the use of slip forms for the piers, as that method of construction had previously proved to be very economical. To permit their use, therefore, the piers were designed as stepped prisms rather than with tapering sides. Although the stepped design required more concrete than a tapered design, the cost of the additional concrete proved to be negligible in comparison with the savings realized through the use of slip forms.

Construction of the Slip Forms

A typical slip form as used on this job was 4 ft. high, and was made up of 1-in. by 3-in. tongue-and-groove lumber backed by two rings of triple 3-in. by 10-in. wales. Bracing was provided by timber yokes running transversely and longitudinally across the top of the form and extending down on the outside. The yokes were secured to the wales by bolts and rods. Power for lifting a form was supplied by 20 to 24 screw jacks, the number depending on the size of the form. Each jack was clamped to a 1-in. vertical steel rod, which acted as part of the vertical reinforcing steel of the pier, and turned in a threaded block secured to the yokes. To maintain the proper position of the jacking rods and the vertical reinforcing steel as the form was raised, a timber template, extending about 10 ft. above the top of the form, was attached to the yokes.

The template carried a platform which served as a deck for the chutes and hoppers used in placing concrete in the form. Around the top of the form was constructed



Elevation of new bridge over the Cumberland river

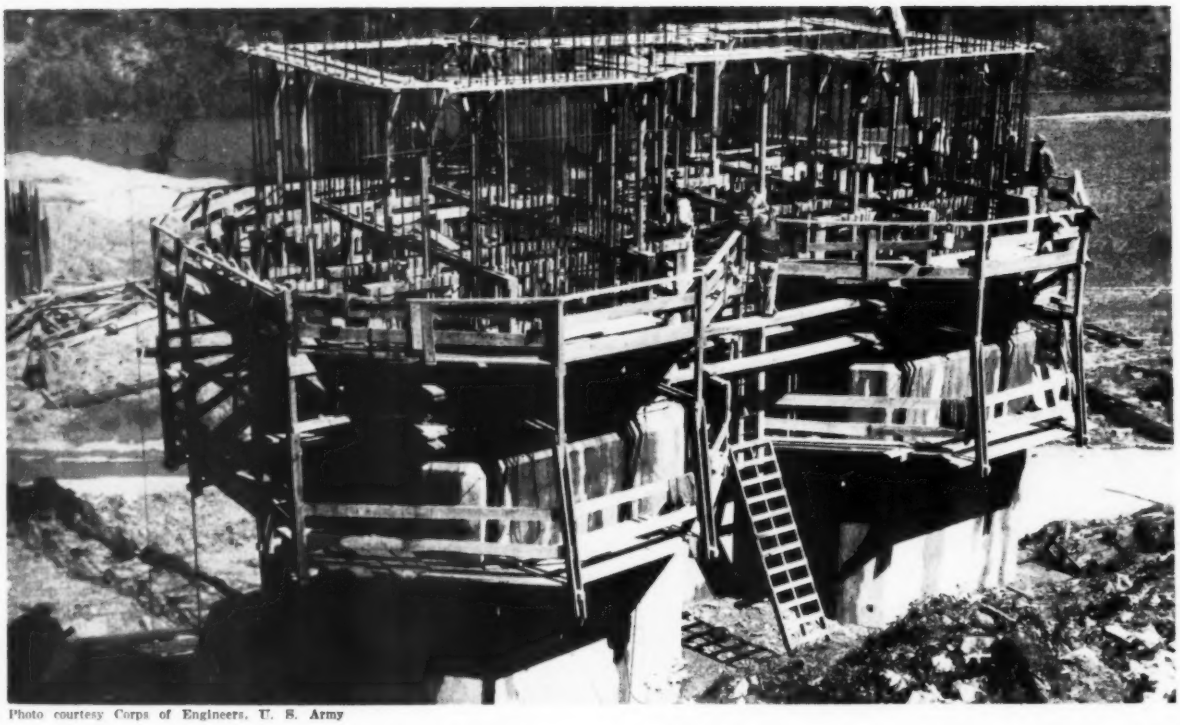


Photo courtesy Corps of Engineers, U. S. Army

A typical slip form was 4 ft. high, and was made up of 1-in. by 3-in. tongue-and-groove lumber backed by two rings of triple 3-in. by 10-in. wales. Template above top of form held reinforcing in proper position and also served as a working platform. The platform around top of form was used for jacking and general work within form. Concrete finishers worked on lower deck

another platform which served as a working deck for the men who operated the jacks and placed the reinforcing steel. This platform was also used for inspection and general access to the work in the form. The concrete finishers worked on a third platform suspended about 4 ft. below the bottom of the form.

Placing the Concrete

Concrete was deposited in the forms by either of two methods. In one method, used for the lower sections of the shafts, the concrete was carried from the mixer to a form in concrete buckets handled by a crane or stiff-leg derrick, and was discharged into a hopper equipped with elephant trunks, which prevented the possibility of depositing a large volume of concrete directly against the form. The second method involved discharging the concrete directly from the mixer into a bucket inside a steel tower, then hoisting the concrete to a hopper attached to the tower above the form. From the hopper the concrete was carried to the form as needed through a swinging chute discharging into the chutes on the upper working platform. For Pier 1 (see drawing) it was necessary to carry the concrete across the river. This was done with the aid of a Pumpcrete machine which pumped the concrete through an 8-in. steel pipe supported on steel barges. The pipe discharged the concrete into a hopper at the pier site, from which it was carried to the form by one of the two methods described above.

The best results were obtained when the concrete was placed at a rate which kept the form full at all times. Generally speaking, the jacking operation was started when the bottom 12 in. of concrete in the form had set sufficiently, and was then carried on at a rate that kept from 12 to 14 in. of hard concrete in the bottom of the form at all times. The hardness of the concrete was tested by pushing a ½-in. steel rod down from the top, and also by checking the exposed concrete at the bottom of the form.

Concrete placed in the form was consolidated by workmen booting it into place. Power vibrators were not used because there was too much danger of the workmen allowing them to damage the concrete below the slip form. It was found that, generally speaking, concrete with a 3-in. slump produced the best results. Concrete with a 2-in. slump was used at times, but placing costs increased with its use. Puddling sticks were used next to the form to eliminate air and rock pockets.

Rates of Progress

Concreting by the slip-form method was carried on at intervals from April through December. The rate of pouring varied, depending on the temperature of the concrete placed in the form. In the spring, when neither the water nor materials were heated, the rate was about 4 in. per hr. During the summer months the rate of pouring was as high as 7¼ in. per hr. The last slip-form pour was made at the end of 1949, with temperatures ranging from 22 to 50 deg. When pouring concrete during cold weather the water and materials were heated and the shaft was protected by the use of tarpaulins hung from the working platform. The temperature of the concrete when it reached the form was 65 to 70 deg. The average rate of pouring the concrete during cold weather was also 7¼ in. per hr.

The rates of progress mentioned above are averages figured from the time the first batch was placed in the mixer to the time the last concrete was placed in the form.

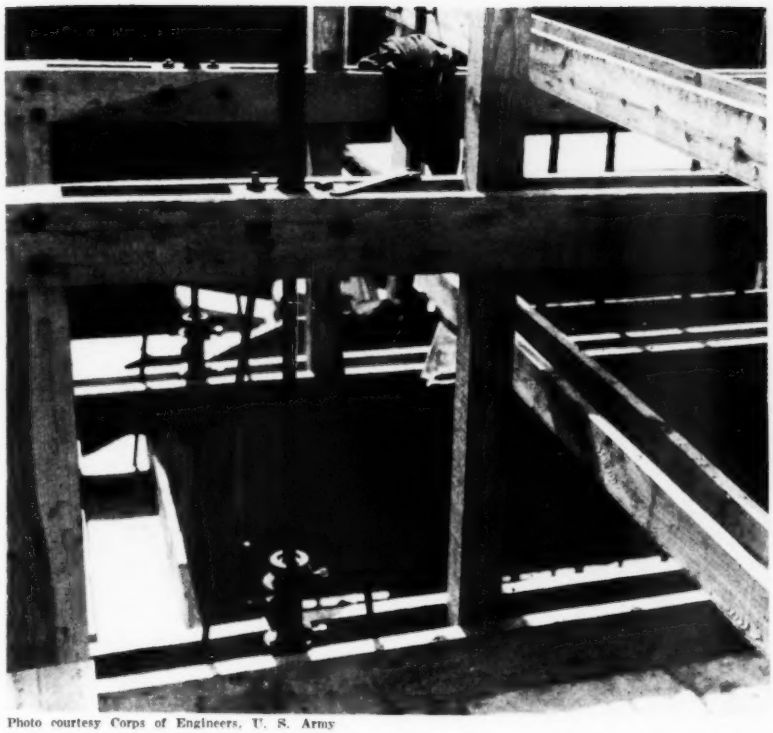


Photo courtesy Corps of Engineers, U. S. Army

The screw jacks used to raise slip forms were clamped to 1-in. vertical rods, which acted as part of vertical reinforcing steel, and turned in threaded blocks secured in timber yokes which ran across top of form. Number of jacks ranged from 20 to 24

However, after the pours were underway, the rate for 12 hr. reached as high as 9 in. per hr., and for a 24-hr. period, 8½ in. per hr. Breakdowns of machinery and the raising of the hoppers and chutes on the tower retarded progress from time to time.

Jacking Operations

The mechanical operation of jacking the form was quite simple. Two to four men walked around the working platform giving the screw jacks a ¼ to ½ turn at a time, which raised the form ⅛ in. to ¼ in. The frequency and amount of turning depended on the rate of setting of the concrete. Level marks were set on the jacking rods before the jacking was started, and pointers were attached to the form or yokes. The pointers were securely fastened in position so that the form could be brought back to level by a new reference line in case the old one was lost. It was necessary to keep the form in a level plane at all times to prevent overstressing of individual jacking rods. The vertical alinement of each pier was maintained by checking points brought up along the face of the pier against plumb lines hanging from the form. These points were checked about twice each day with a transit to insure their accuracy. Maintaining a true position of the form required constant supervision, since the form was constantly moving and therefore had no anchorage to fixed points.

On the lower sections of the piers, because of their large cross section, the forms showed a tendency to act as separate units on each barrel of a pier, with the result that their original cross section sometimes became distorted. Therefore, after completion of two pier shafts, the contractor's superintendent decided to truss the two sets of wales on the form. This stiffened the form materially and relieved a situation which had given considerable concern to all connected with the operation. Proper alinement was obtained with much less detailed supervision after the wales were trussed.

Placing the Reinforcing

At the beginning of a shaft pour, reinforcing steel was placed in the usual manner. The horizontal bars were placed to the top of the form and additional bars were added as the form was raised. The splicing of the jacking rods was staggered so that alternate screw jacks could be released and raised. The vertical steel was spliced at about 20-ft. intervals, with about half of the bars spliced at the same elevation. The steel was raised to the working platform by a crane or by a small Chicago Boom attached to the steel tower that was used to hoist the concrete.

At the beginning of the slip-form operations it was necessary to caution the workmen about distributing the extra steel on the working platform. The tendency was to place it all on one side instead of uniformly and this extra weight on one side caused trouble with alinement.

Finishing Work

The concrete finishing work involved the application of a wood float immediately under the form, and the repair of any small depressions. After the crews became experienced in placing the concrete, finishing was an easy job, requiring only one man.

A horizontal ring of perforated pipe was attached to the form for use in curing the concrete. Water from this pipe sprayed continuously on the surface of the shafts for a period of ten days. The pipe was hung in a position that permitted application of water to the surface of the pier at the point where the concrete was changing from dark gray to white.

Changing Cross Section of Forms

When a change in cross section of the shaft was reached, the operation was stopped until the form was cut down to fit the next section. Generally, the form was cut down on the pier, although in some cases a new form was ready to put up. About five days was needed for the change in either case.

When the shaft had been concreted to the elevation of the bottom of the cap, the slip form was anchored to the shaft and used as a support for the cap form. The hoisting equipment used in concreting was also used to place the grillage and anchor bolts.

The completed pier shafts present a very uniform appearance. The construction joints are not as noticeable as in piers made with conventional forms, and in general, the alinement is more accurate. Close supervision and inspection can maintain vertical alinement within very accurate limits.

A section of high-speed main line of the Erie near Lima, Ohio, after completion of power-ballasting operations

Power Ballasting
As It Is Done on the Erie

By ARTHUR PRICE
Division Engineer, Erie
Jersey City, N. J.

Gang organization, procedure, output, costs, and the quality of the work done, are discussed in this article which consists of an address presented by Mr. Price before the Metropolitan Maintenance of Way Club, New York. Originally, the power-ballasting machines were used on the Erie only as single units, but experience of the last working season has shown that savings can be realized by operating two units together in tandem.

Arthur Price

• The basis of a well-maintained track is the ballast section. An unevenly-tamped roadbed will cause excessive wear to all portions of a track section. In order properly to construct a ballast section that will give a completely uniform support to the track, the Erie has turned to the use of power-ballasting machines.

Hand tamping has never proven satisfactory. This is true because each man tamps differently, and even in the best gangs some men tamp inefficiently. Tamping with individual pneumatic tamper guns overcame this difficulty to some extent, but even here the individual handling the tool largely controls the quality of the tamping work done. We have found that, with power-ballasting machines, it is easier to control the uniformity of the tamping, while at the same time substantially reducing the cost of the work. The important thing about power tamping is to use a machine which will place sufficient quantities of ballast under the ties and at the same time compact this ballast so that the voids are reduced to a minimum.

My experience with power-ballasting machines has been entirely in crushed stone ballast, using an impact machine. Since I have had no experience with the vibratory machines, I will confide my remarks entirely to the impact type.

The power-ballasting machines used on the Erie each have a 6,200-lb. head which is raised and then released, dropping the tamping shoes with an impact of 173,600 in.-lb. and thus forcing the stone ballast under the tie and compacting it. The tamping shoes are so arranged that the tie is tamped on each side of both rails.

The most important step in the power-tamping operation is the proper unloading and distribution of stone ahead of the machine. In our operation we use hopper cars and utilize load binders to control the opening of the hoppers and wood trays under the hoppers to distribute the stone. Each tray is constructed so that it extends 8-in. outside of each rail and has a 4-in.

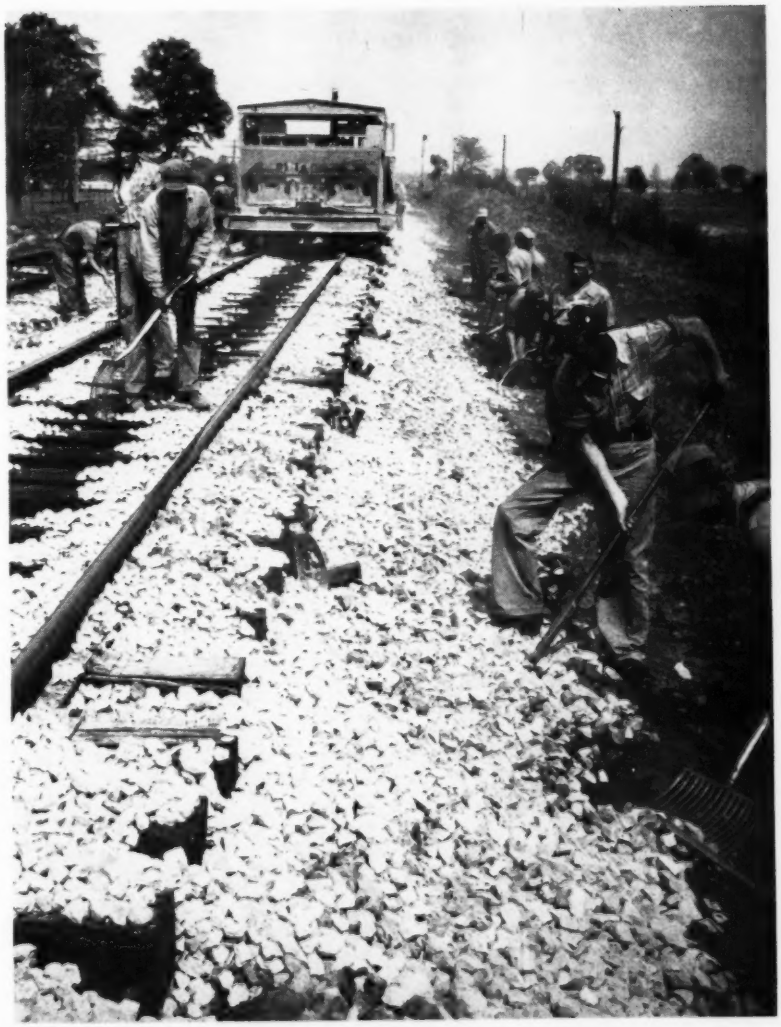
With a single Power Ballaster the Erie tamps an average of 3,000 ft. of track a day in 6½ hr. of actual work

opening on each side of each rail. The tray is chained to the car under each hopper and slides on the rails. The volume of stone deposited on the track is governed by the amount the pocket of the car is opened and also by the speed of the train.

The track should be inspected by the supervisor or foreman prior to unloading the stone so that more ballast can be unloaded in sags or in cribs that are scant or bare. The normal track not cribbed requires an average of 500 tons of stone per mile for a 2¾-in. raise. At present the stone used on the Erie for tamping with power-ballasting machines has a minimum size of 1¾ in. and a maximum of 2¼ in. on a square screen.

For three years we operated the power-ballasting machines as single units but last year we started using them in tandem. With single units we used an organization consisting of 2 foremen, 4 assistant foremen, 3 operators, 38 trackmen, 1 timekeeper, 1 mechanic, and 1 operating department flagman. In most cases it was attempted to detour trains around the operation. However, it is generally necessary to close up for an average of two trains per day. Using this setup, we will average 3,000 ft. per day of tamped and dressed track in 6½ hr. of actual work.

At this point it should be mentioned that the practice on the Erie is to reballast or surface track one year, making such tie renewals as may be necessary and also



Raised track ahead of the machine is supported on 14 to 20 small jacks on each side

Two machines working together averaged over a mile per day of completed track

spacing the ties, and then going back and power tamping the track the following year. Where this two-year cycle is not followed, ties are either dug in or a tie raise is given the track prior to the power-tamping operation.

The entire organization mentioned above is under the supervision of one foreman who also sights the track on a spotboard for the initial raise with the power jack (the practice of raising tracks to stakes set by the engineers is not followed on the Erie). The track is raised by the power jack and one tie is tamped by hand by two trackmen using forks, who also push the power jack to the next location to be raised. The track is raised by the power jack at each joint, in other words, at intervals of half a rail length.

Following behind the power jack two trackmen dig holes for the hand jacks. We use small jacks placed under the ends of the ties, these jacks being spaced every fourth tie. Fourteen to 20 jacks are used on each side. One assistant foreman raises deflections and checks with a level board between the power jack and the ballaster. Two trackmen carry jacks ahead; two place and pump the jacks; two space ties between the ballaster and the power jack; and two trackmen equalize the ballast ahead of the ballaster. This machine, operated by one man, strikes five blows per tie. An assistant foreman, working with the machine, supervises the throwing in of stone by three trackmen as necessary.

Two trackmen, following behind the machine, drive down spikes and adjust rail anchors. An operator and one trackman tighten bolts with a power wrench. One foreman and 10 men line track. The track is rough lined behind the machine in the afternoon; in the morning the previous day's work is brought to final line. The track is dressed by an assistant foreman and four men. One trackman oils the joints. An assistant foreman, with a spot-tamper outfit, follows one day behind the power ballaster and takes out any deflections and tightens up any loose ties which may have developed under traffic. This is an important item in the use of power-ballasting machines as it gives what might be called a "tailor-made" finish to the riding qualities of the track.

In raising track with the power-ballasting machines we experimented with various numbers of blows per tie—first six blows; then five blows under intermediate ties, and six blows at joints; then four blows under all ties. We found that the track held as well with five blows as with six blows. We also found that, using five blows at the intermediate ties and six blows at joint ties, the joints are stiffened just enough so that it could be felt in the riding of the track. The section of track tamped with four blows did not hold up as well as the others. We, therefore, decided to use five blows at all ties.

Tandem Operation Started

Last year it was decided that a saving could be made by operating the power-ballasting machines in tandem where the length of the job was such that the doubling of the gangs was warranted. In this setup, it was first suggested that every other tie be tamped with alternate machines; however, it was felt that, due to the slight differences between machines, we would not obtain uniform tamping by this means. It was then decided that the first machine would tamp the tie three blows, which is sufficient to hold for the next machine, and the following machine would tamp two blows. No two machines, even identical ones, will operate at the same speed and there is a difference in operators, one always being slower than the other. It follows that the slower machine and operator should be placed last.

The organization used when operating the machines in tandem includes 2 foremen, 5 assistant foremen, 4 operators, 59 trackmen, 1 timekeeper, 1 transportation department flagman, and 1 mechanic. Thus, as compared with the practice of operating the two machines separately, there is a saving of 2 foremen, 3 assistant foremen, 2 operators, 17 trackmen, 1 extra gang timekeeper, 1 transportation department flagman, and 1 mechanic. This organization represents a saving in wages of $293 per day. For the last season the two machines working together averaged over a mile per day of completed track.

We find that the power ballasting of track gives, at a greatly reduced cost, a finished track comparable in riding quality to track tamped by pneumatic tampers. The average 12-tool pneumatic outfit consisting of 22 men will complete an average of 850 ft. of track per day at a cost of $1430 per mile, compared to a cost of $900 per mile using a power ballasting machine as a single unit, and $707 per mile using power-ballasting machines in tandem.

Track that had been tamped with the power-ballasting machines was inspected by removing some of the ties. We found that there was exceptionally good compaction of the stone under the ties, extending under the rail. The first track tamped by this method on the Erie three years ago is still riding good and maintenance has been slight. The cycle which governs the tamping of track depends entirely on local conditions, such as the condition of the subgrade, the amount and character of traffic, weight of rail and many other conditions, so that the frequency of power tamping must be governed by these factors.

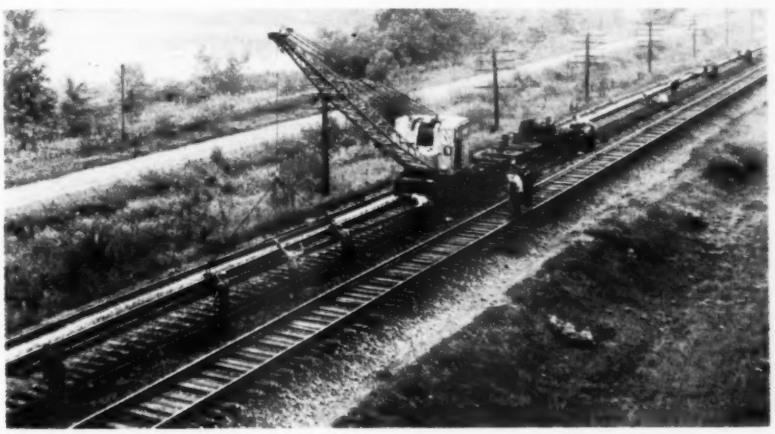
Burro Crane with Long Boom
Speeds Laying of 78-Ft. Rails

• As the basis of a study to compare the service performance of 78-ft. rails with 39-ft. rails, the Pennsylvania recently installed in its eastbound main track near Hamlet, Ind., a track-mile of the longer rails and, immediately adjoining them, 1½ track-miles of the shorter ones. Of particular interest in this work was the fact that the 78-ft. rails were laid as quickly and as easily as the 39-ft. rails. The key to this performance was a new machine in use for the first time—the Model 40 Burro crane equipped with a 55-ft. boom. Working with a standard Pennsylvania rail-laying gang, the crane switched from laying the shorter rails to the longer ones without a pause except to exchange the single rail tong for a spreader. And the only change necessary in the organization of the rail-laying gang was the addition of two men.

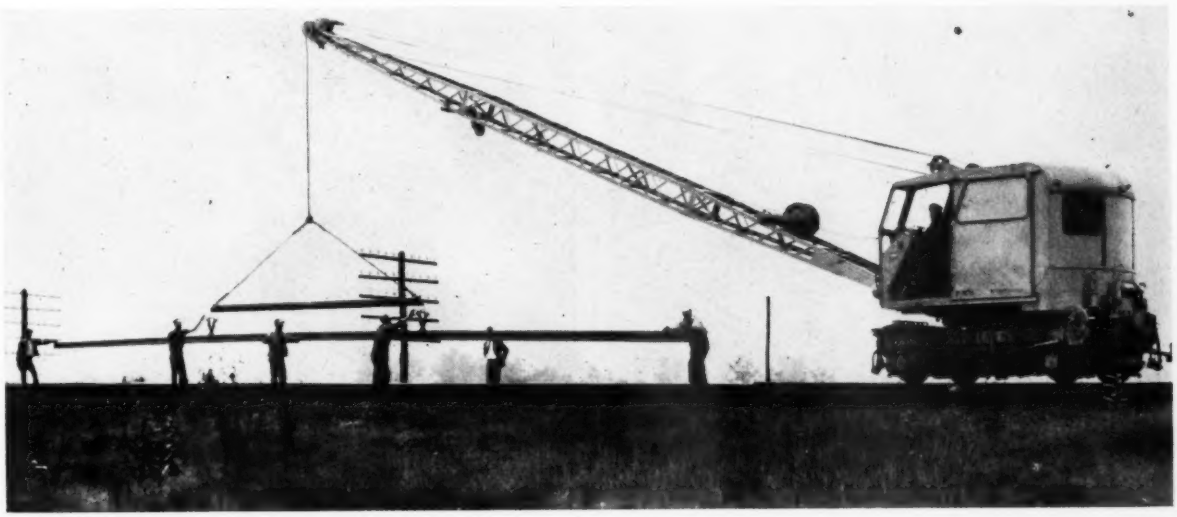
The spreader used in laying the 78-ft. rails was designed by the Pennsylvania and consists of two tongs attached to the ends of a 26-ft. length of 6-in. pipe, which in turn is carried by the hoisting cable of the crane in a balanced position. Lifting the long rails into position with the spreader required five men. One man spotted the center of the spreader pipe at the center of the long rail as marked by the weld; one man was stationed at each of the two tongs; and one man was stationed at each end of the rail to guide it into position. When laying 39-ft. rails, of course, only three men were required; one at the tong and one at each end of the rail.

The new Burro crane was designed specifically for laying 78-ft. rails. Its weight has been increased sufficiently to counterbalance, with a factor of safety, a 78-ft., 155-lb. rail lifted at a radius of 55 ft. The weight increase has been accomplished, however, without any change in the dimensions of the machine. The new model has the same short tail swing featured in previous models, and the same low height.

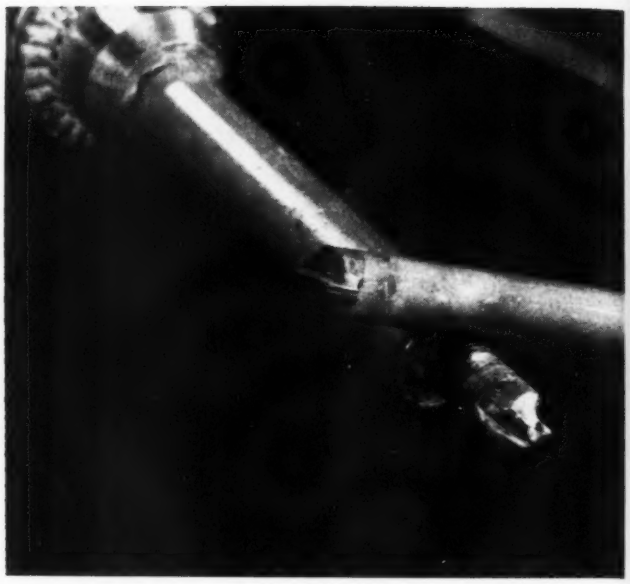
A number of other design improvements have been incorporated in the Model 40. It has been equipped with straight and automatic air brakes, and with air-operated controls throughout. Its gears are machine cut and run in oil; its clutches are all the same size and interchangeable; and its drawbar pull has been considerably increased.



Working with a standard Pennsylvania rail-laying gang, the long-boomed Burro crane shown in these photographs switched from laying 39-ft. rails to 78-ft. rails without a pause except to replace the single rail tong with a spreader



Driven by this ½-in. ball-bearing portable electric drill . . .



the carbide-tipped bits pierced 1⅛ in. of concrete in 10 sec.

Electrical Fixtures

Placed with Special Tools

In applying electrical equipment to concrete surfaces and steel members in its new Diesel shop at Springfield, Mo., the St. Louis-San Francisco used carbide-tipped drills and powder-actuated tools for inserting the fastenings. The use of these tools permitted completion of the work in record time.

• The use of carbide-tipped drills and powder-actuated tools for applying fastenings in concrete and steel, respectively, greatly facilitated the work of installing electrical fixtures, switches, receptacles and conduit in a new Diesel shop recently constructed by the St. Louis-San Francisco at Springfield, Mo. Neatness of appearance, as well as permanence, was particularly stressed in this installation.

After scribing and prick-punching the precise location of each fastening, the holes for the fasten-

After loading this tool with a fastening and 22-cal. shell . . .

the shell was fired by rapping back of tool lightly, thus . . .

This lever was rigged up to obtain greater pressure when drilling holes in ceiling

ings in concrete were drilled to a depth of 1⅛ in. The carbide-tipped drill bits used in this work, manufactured by the Willeys Carbide Tool Company, Detroit, Mich., were driven by a ½-in. ball-bearing electric drill having a no-load speed of 525 r.p.m. To control the depth of penetration each drill bit was threaded through a length of pipe which acted as a stop when the desired depth was reached.

It was found that the drill worked best when more pressure was applied to it than could be developed manually. When drilling holes in the ceiling the additional pressure was obtained by a timber lever rigged up as shown in one of the accompanying photographs. With arm lengths in a ratio of four to one, the lever was supported on a saw-horse fulcrum placed on top of a work bench. A pair of cleats on the short end of the lever held the handle of the drill in proper position when pressure was applied.

The ceiling holes were drilled dry, but water was used when drilling in the side walls and the floor. The drilling time at each location was about 10 sec. The fastenings placed in the holes are ¼-in. 20 thread lead anchors made by the Paine Company, Chicago.

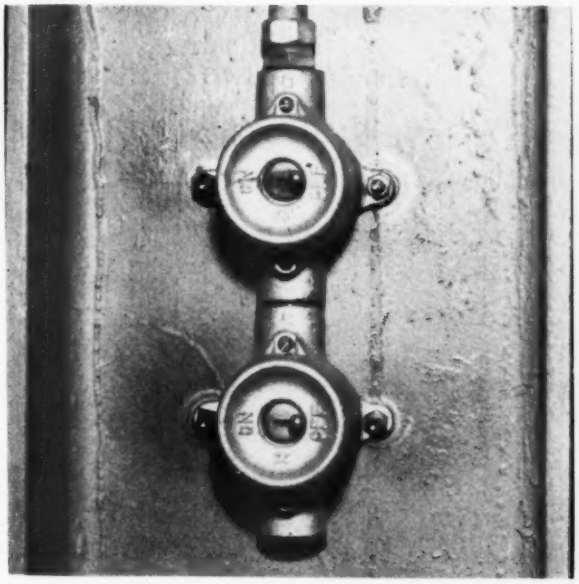
Fastenings in Steel

The tool used for driving fastenings into steel columns and other steel surfaces is known as the Ramset fastening tool, and is made by the Stemco Corporation, Rocky River, Ohio. The fastening used with this tool is cylindrical in form, having a ¼-in. threaded section at one end and a ⅛-in. ribbed or fluted section terminating in a hardened point at the other end. It is placed in the tool with a special 22-caliber shell behind it. Then the shell is fired by striking lightly the back of the tool. The force of the explosion drives the point of the fastening into the steel member.

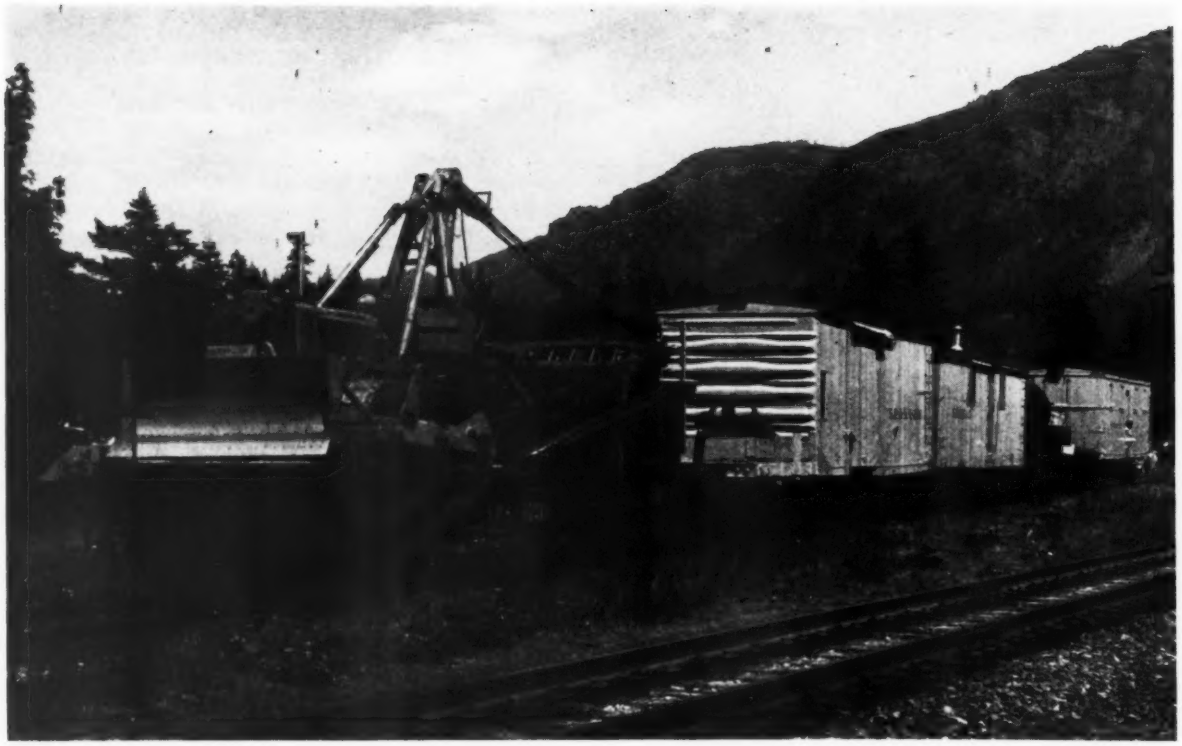
On this job a shell was used with sufficient power to drive the point of a fastening entirely through steel 7/16-in. thick and cause it to project slightly on the opposite side. Other powder loads are available if greater or less penetration is desired.

After the fastenings were in position, it was a simple matter to install the fixtures or fittings. All that was necessary was to place them on the fastening projections and secure them with ¼-in. 20-thread nuts.

embedding the fastening in steel column. After fastenings . . .

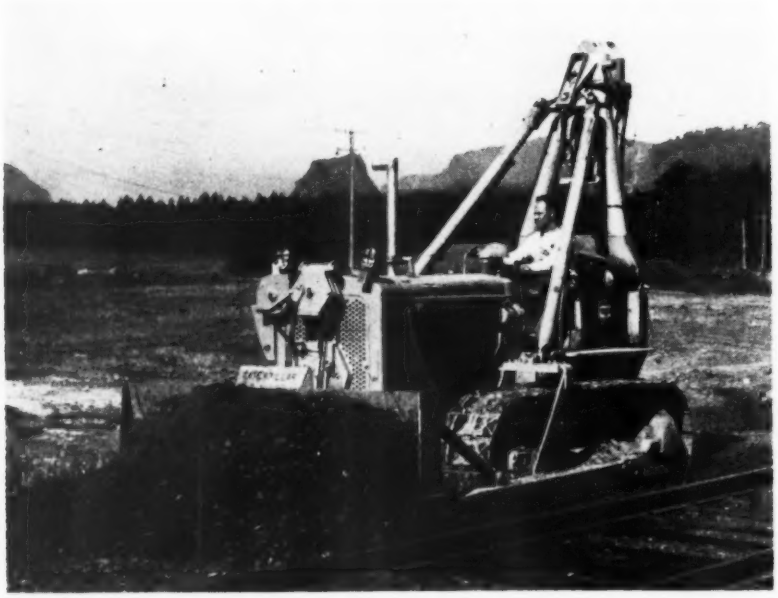


were set, fixtures were secured to their projections by nuts



With this self-contained work-train outfit a two-man crew can carry out almost any crane, bulldozing or excavating job. Unit is moved in trains from point to point on the road as needed

Two-Man Work Train
Cuts Costs on the S.P.&S.

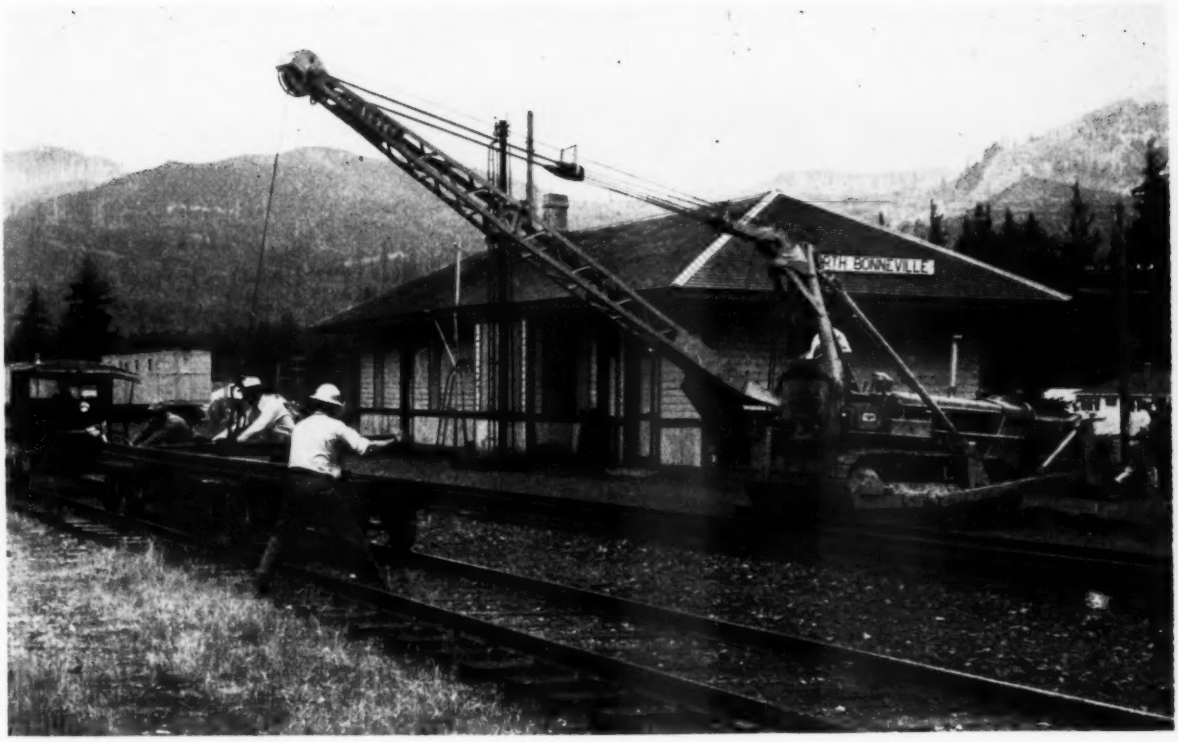


For heavy bulldozing work, as shown here, the Hystaway boom and base unit are demounted. For light bulldozing and grading, however, disassembly is not necessary

• The Spokane, Portland & Seattle is combatting the high cost of conventional work-train service with a work-train outfit that requires no train crew or locomotive while on the job. Completely self-contained and operated by only two men, this outfit consists of five cars and a Caterpillar D6 tractor with Esco track-walking shoes, a 6S bulldozer blade, and a Hyster Hystaway attachment equipped with a 25-ft. boom and a ⅜-yd. dragline bucket.

The unit is moved in trains from point to point on the road as needed. One week, for instance, it might be parked on a siding near Bonneville dam where a new track is to be constructed, and the next week it might be working on a grading job in the Deschutes River gorge. With this equipment the two-man crew can carry out almost any crane, bulldozing, or excavating job, such as loading and unloading rail, laying rail, handling material, grading, filling, and ditching. And the work can be carried out either as an on-track or off-track operation, as necessary.

The rolling stock of the work



Here the basic unit of the work train—a Caterpillar D6 tractor with a Hystaway attachment—is being used to load rail for a new spur track near North Bonneville. Length of the boom is 25 ft.

Using a Caterpillar D6 tractor with a Hystaway attachment as the basic unit, the Spokane, Portland & Seattle has assembled an efficient and economical work-train outfit which permits two men to carry out almost any crane, bulldozer, or excavating job anywhere on the railroad

train consists of a flat car for transporting the tractor; a rebuilt box car for repair parts, fuel storage and tools, with an open section for storage of bulky items such as the dragline attachment; another flat car with a large water-storage tank and with room for storage of construction materials; a bunkhouse for the assistant operator; and a car for the operator and his family.

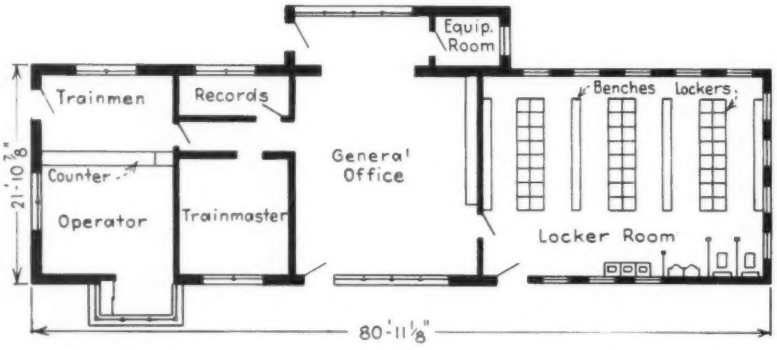
Here is how the work train is operated. When a roadmaster calls for the unit, it is dispatched to the siding nearest the job. Upon arrival a ramp is lowered and the tractor and Hystaway combination is walked off the flat car. The tractor then travels under its own power to the site of the job. The track-walking shoes make it possible to run directly on the rails if desired.

If the work calls for heavy bulldozing or blading the Hystaway boom and base unit are demounted. This can be done by the two men in 15 or 20 min. For light bulldozing and grading, however, it is unnecessary even to remove the boom.

The Hystaway boom and base unit can be remounted, as shown here, for crane work in 20 to 30 minutes. Dismantling work requires a period of only 15 to 20 minutes

Easy to look at and pleasant to work in is this new yard office on the Kansas City Southern at New Orleans, La.

Something Different IN YARD OFFICES



Above—Floor plan of the new yard office on the K.C.S. Roof of the building is covered with five-ply built-up roofing and is edged all around with a metal facia board

Below—Interior of the general office. Walls above the plywood wainscots are finished with Flexboard sheets joined by strips of aluminum. Room is air conditioned

• A yard office that differs from the usual structure of this type in that appearance as well as utility was emphasized in its design was recently constructed by the Kansas City Southern at New Orleans, La., as part of an expansion and improvement program currently under way in its freight yards there. The architectural treatment given the structure has attracted considerable attention from motorists and others traveling the New Orleans Air Line highway, which passes the building. Even while the structure was under construction, a doctor stopped to secure a set of working drawings, which he used for building a clinic.

The dimensions and interior arrangement of the new yard office are shown in the accompanying drawing. The exterior walls of the locker-room portion are covered with Johns-Manville asbestos-cement siding of a color described by the manufacturer as tan blend. The walls of the office portion are of brick, or of paneled wood siding above a brick base course.

The interior walls of the locker room are finished with Flexboard sheets joined by strips of aluminum. The ceiling in this area is covered with acoustical tile and the floor is of concrete.

Asphalt tile covers the floor in the office portion of the building. The partition between the general office and the trainmaster's office is constructed of Band Lite corrugated glass. Other partitions and interior walls in the office section are finished either with wood paneling or with Flexboard above plywood wainscots. Except for the locker room the building is entirely air conditioned.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems

Testing Level Boards and Gages

How often should a section foreman's track level be tested? His gage? Who should make the test in each case? How should the test be made?

Make Master Test Each Year

By ADOLPH DRAGER

M/W Storekeeper, Central Railroad of New Jersey, Elizabethport, N. J.

Track levels are equipped with spirit levels which are often subjected to rough handling when carrying the tools around on push cars, motor cars, trucks, or other modes of transportation. As these spirit levels are very sensitive, they easily get out of adjustment from such rough usage. For that reason all track levels, sighting and spot boards should be tested for accuracy every day before any work is done with them. If the spirit level is out of adjustment it should be corrected. A level track is the most desirable place to make such tests but they can be made on any straight track. The best time for testing is immediately before using the level.

All spirit levels on level, sighting, and spot boards should be equipped with adjustment screws by means of which corrections can be made when tests show adjustments are needed. The section foreman should be instructed as to the manner of making such adjustments and told to do so whenever necessary. It is advisable to have an authorized person check the accuracy of all level, spot, and sighting boards in the field about once a year. At that time, worn-out elevation slides on level boards, defective legs on spotboards and inaccurate sighting blocks should be replaced.

Track gages should always be accurate. They should be tested for accuracy on a master or test gage in the storeroom and the date the test is made stamped on them before they are shipped out.

Each section foreman should have two identical gages which from time to time should be tested on the track, one against the other. For both to be accurate they should be exactly alike,—4 ft. 8½ in. If there is the slightest difference between them, the inaccurate gage must be determined and a new gage should be obtained.

All track gages in the field should be further tested with a master or test gage at least once a year—usually in the spring—by an authorized and competent person. At that time a record should be made of each defect, such as: (1) Gage too long (state amount); (2) gage too short(state amount); (3) prongs not square; (4) prongs loose; (5) other defects. No tolerance should be allowed on any gage tested and a defective or inaccurate gage should be destroyed and replaced with a new one immediately. No repairs should be made to old gages because it is uneconomical to do so and often results in inaccurate gages getting into service.

A tested gage should be distinctly marked. One scheme is to paint part of the handle green or yellow, selecting a different color scheme each year so that all interested parties can tell at a glance that the gage has been tested.

Test According To Usage

By MALCOLM E. CONDON

Construction Supervisor, Office of Engineer M. of W., Erie, Jersey City, N. J.

Both the track level and the track gage used by a track foreman should be tested weekly with ordinary usage, and even daily when

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the March Issue

1. What is the maximum distance bulldozers can push material economically? What factors determine the distance? Explain.

2. What are the advantages and disadvantages of sectional metal scaffolding for use by B.&B. forces? To what extent can its purchase be justified? On what basis should such scaffolding be assigned to railroad forces?

3. What is the safest, cleanest and most economical method of delivering fuel and lubricating oils to a single unit of work equipment on line of road? To several machines at one location? Explain.

4. What are the most practicable methods of furnishing steam for pile drivers in completely Dieselized territories? Explain.

5. Where manganese crossing frogs are subjected to fast, heavy traffic, is it a better policy to weld them, when necessary, in or out of track? Why? What factors determine when they should be welded? Explain.

6. In supplying fuel and boiler water to Diesel locomotives, is it better to provide several relatively long hoses or to install a series of standpipes each having a short flexible hose? Explain.

being used continually on rebal-lasting work, rail laying, regaging, tie-plate renewals, etc., where the more frequent use and handling could result in damage. In other words, the greater the use of these two tools, the more frequent should be the inspection and checking.

The checking of the level and gage should be done by the foreman, or, in the case of an extra gang, by one of the assistant foremen as an assigned duty. It is important that the track supervisor also check these tools periodically, with an average frequency of at least once each month, to impress upon the foremen the importance of keeping the gage and level in correct adjustment, and to assure himself that the tools are being checked regularly.

The track level can be checked in the field by selecting a relatively level track section and trying the level in one position, marking the bubble extremities on the level guard. Then, by reversing the track level at the same spot and again marking the bubble extremities, the amount of necessary adjustment can be seen in the variation between the two markings. Turning the leveling screw to correct for one-half of the variation in the markings should result in the proper adjustment. Repeat the checking process until the bubble assumes the same position, both normal and reversed. The complete checking operation will take but a few minutes, once the foreman understands the method.

With the track gage, a steel tape, a good folding rule or steel pocket tape can be utilized in making a field check. It is important that the measuring tool be accurate, and that the checking measurements be made carefully. A relatively foolproof method is to measure the gage of the track at the gage line with an accurate rule or tape, and if exactly standard or slightly in excess, place the track gage to be checked at the same spot in position on the rails. Check the difference between the flange of the track gage and the gage side of the rail, and compare it with the difference between the measured distance and standard gage. In other words, if the measured gage was found to be 4 ft. 8¾ in., and with the track gage in position, a quarter-inch gap existed between the track gage flange and the rail, then the track gage would be correct. Any variation from the quarter-inch gap would indicate the amount of necessary adjustment.

It is important that maintenance employees appreciate the necessity of giving both the track level and the track gage the best possible care in their use, handling, storage and transportation. Breakage of either tool, and the lack of a replacement, can easily disrupt a day's work out on the line.

Too Many Gages Inaccurate

By Section Foreman

It should be the duty of every section foreman to test his level board at the beginning of each day during which he expects to use it. It should also be tested at any moment during the day when it appears to be out of level, a fact which can be discovered by the foreman in sighting both rails while surfacing.

Level boards should be tested on a tangent track that is level. The foreman does this by placing his level board across the rails, noting the position of the bubble, then reversing the level board. If the bubble shows level both ways the level board is accurate and o.k. for use, but if it is level one way and not level the other, the level board should be adjusted or exchanged for a new one.

Whenever a young man has been promoted to foreman, the roadmaster or supervisor should show him how to test and adjust his level board. To my way of thinking, a level board properly used on the track is worth more than one of our longest freight trains.

There is much room for improvement in the accuracy of track gages because 50 per cent or more of those I have ordered in the past 24 years have not been accurate, many of them being nearly ¼ in. short when received. Therefore, I think: (1) Track gages should be tested first by the purchasing agent who buys them; (2) the roadmaster or supervisor should test the gages on his district at least every 60 days with a steel tape; (3) any foreman who inspects his tools adequately will know when his gage is loose, warped, or bent but, since very few foremen are furnished steel tapes, he will have to ask his roadmaster or supervisor to test his gage with a steel tape.

Very few railroad men ever realize the true importance of the track gage. To illustrate that importance ride a train over a section that has lots of kinks in the gage rail, and note the roughness of the ride. Then go to the foreman of this section and ask him the cause of the kinks. He will tell you that many of those kinks were caused by putting in crossties over a period of years with several different track gages that may not have been accurate when received by the foreman. That places the cause of the rough ride on the track gage's inaccuracy and the failure of the foreman to know it was inaccurate, or if knowing, on his having used a defective tool. Therefore, I think the track gage should first be tested by the purchasing agent, second by the roadmaster or supervisor and third by the section foreman.

Foremen Check Levels Daily

By C. J. Miller

Assistant Roadmaster, Western Pacific, Elko, Nev.

A track foreman's level board should be tested each and every time that he begins a day's work which will include its use, and as many times during the work day as he thinks necessary. The testing is a very simple procedure and must be entrusted to the individual foreman. The steps are as follows:

(1) If the level board is one on which there is an adjustment for super-elevation, this should be set at zero super-elevation. If the board is of the step type, the bottom of the board (which represents zero elevation) must be used when testing it for accuracy.

(2) Select a spot on any track having no super-elevation and which is in a reasonably correct-level condition, and place the level board on that spot.

(3) Check the reading and note the position, relative to dead center, taken by the bubble. Whether or not a zero reading is obtained is not important, but the amount of the discrepancy is. Bearing this in mind . . .

(4) Reverse the level board and replace it on the track in the exact spot as before. Now note the DIFFERENCE between the first and second readings. If there is none, the board is accurate. If there is a difference, one half of such error must be removed by use of the

small adjusting mechanism or screw, (which is slightly different on each manufacturer's product). By relocating the bubble to a position midway between the two original readings, the error should be removed. However . . .

(5) Once again return the board to its original position. Does the bubble now read the same as it did after the adjustment was made while in the reversed position? If not, readjust once more to a half-the-error position and again reverse the board for "proof positive". The reading on the bubble tube must be the same regardless of which way the board is turned.

(6) Repeat this adjusting and reversing procedure as many times as is necessary to obtain the desired degree of accuracy.

A track foreman's gage does not lose its accuracy nearly as easily as does the more delicate level board, and the test of accuracy is much simpler to conduct. The gage is merely placed on the track at some spot of known accuracy and any discrepancies noted. There being no method of adjusting the majority of track gages, any reasonably serious inaccuracy should result in the tool being discarded in favor of an accurate one.

These day-to-day tests for accuracy are the responsibility of the track foreman. However, the roadmaster or track supervisor must make his own periodic checks on level boards and gages. The frequency of the supervisor's tests depends on the apparent sense of responsibility of the foreman and on the overall results that he gets from the use of his tools on the job.

Should the level board or gages used within signal territories arouse the suspicion of the signal department they must be checked by the signal maintainer for possible conductivity which might result in a signal failure. Such signal department tests made at regular intervals, constitute the well known "ounce of prevention", of course, and are very advisable.

Thus daily tests must be made by track foremen, and periodical tests should be made by track and signal supervisors of all level boards and gages.

Galvanic Protection of Deep-Well Pumps

How effective are zinc electrodes in preventing corrosion in pumps and water lines? How should they be installed? Explain.

Zinc Lasts Longer

By Kenneth E. Moehrl
Director of Layne Research Department, Layne & Bowler, Inc., Memphis, Tenn.

In any event, the use of sacrificial anodes is not a cure-all for corrosion problems. Properly installed under satisfactory conditions, their use is usually quite effective. In any corrosion problem, however, the causes of the corrosion must first be determined. For certain of these causes, sacrificial anodes will be effective, for others, they will be useless. The more one becomes familiar with corrosion problems, the more one realizes that a thorough and complete study is necessary to suggest the best remedy. In general, the services of a reliable corrosion engineer are warranted.

The metals most commonly used in galvanic protection against corrosion of iron and steel are magnesium, aluminum, and zinc. Magnesium has recently received publicity on its ability to protect cathodically. Its higher position in the electromotive series, of course, indicates that it will develop a higher protecting current density than zinc, but also means that it will be used up more rapidly. In an installation where replacement is difficult, as in a deep-well turbine pump, it would seem impractical to over-protect at the risk of eventually losing all protection. Aluminum is not in too comon use because oxides form on its surface and tend to inhibit further galvanic corrosion.

Zinc, having a higher solution pressure than iron or steel, is more easily polarized by hydrogen. Thus the iron will corrode in a damp atmosphere while zinc will not. But when zinc and iron are in direct contact or proximity in an electrolyte, the hydrogen equivalent of the zinc will plate out on the iron and the result is a fairly rapid corrosion of the zinc with the iron being protected from corrosion.

In using zinc to give protection to iron or steel surfaces, it is not necessary that the zinc element extend the full length of the metal to be protected. It should, however, be spaced at regular intervals according to the surface area of the iron and of the zinc.

Certain techniques have been established for the installation of zinc in deep-well turbine pumps to protect them galvanically. A zinc sheet of ⅛-in. to 3/16-in. thickness may be rolled into a cylinder having an outside diameter practically equivalent to the inside diameter of the pump column. The sheet is not formed into a complete cylinder but is left with a gap between the edges of approximately ½ in. The cylinder may be driven into the end of the discharge-column pipe at the threaded or bottom end. This provides a mechanical and electrical contact.

Another method has been employed in which the diameter of the zinc cylinder is approximately one or two inches less than the inside diameter of the column. Monel bolts or rivets are used to mount the cylinder into position, using a hole drilled through the zinc cylinder and the pump column at the point where the cylinder is to be installed. Insulating spacers are used between the zinc and the metal. Some trouble may be experienced with the contacts where the zinc protectors are bolted directly to the iron or steel surface to be protected. The anodic current density naturally is highest where the metals come together, and since the zinc is rapidly eaten away at such points, the contact soon becomes bad, bringing the protection to an end.

If the zinc cylinder is fixed at a certain distance from the surface to be protected, and connected to it by suitably insulated wire, this trouble should be avoided; in addition, the zinc should be eaten away more slowly and the protection spread over a larger area. The zinc in such installations may be held in position in the pump column by means of insulation spacers without rivets. Should the electrical contact between the zinc and the iron or steel open (by corrosion or otherwise) so that the current flow must be conducted across a water-filled gap the current and its protective action will be reduced, or cease.

The use of bars or slabs of sacrificial anodes should be avoided in the protection of a deep-well turbine pump column. Disintegration of the suspending anchor will al-

low the anode to fall through the column to the pump bowls where serious damage may be caused. The utmost caution must be exercised in securing any tye of anodic material.

For protection of the outside of the pump column, it is always advisable to use short cylinders of zinc near the column couplings. The threads cut on the end of the column expose raw metal which is electro-chemically more active than the mill-sealed surface of the rest of the pipe. No-load potentials as high as 0.1 volt have been observed between fresh and sealed surfaces. The combination in this case is further bad in that the active surface is small compared to the passive or noble surface. Additionally, in the formation of pits, the partial exclusion of oxygen in the re-entrant surfaces increases the intensity of the corrosion current.

It has frequently been stated that under certain circumstances zinc protectors become cathodic to steel. This does not necessarily mean that the zinc protectors are useless, since the scale of carbonate on the steel in the opening stages when the zinc is still anodic may continue to protect after the polarity has reversed.

Soil corrosion (water lines) is usually considered to occupy a position between atmospheric and immersion corrosion (pumps). The soil may be considered as a sponge containing varying amounts of moisture and oxygen. The degree of corrosion will therefore be determined by the resultant amount of these two factors present. Soil corrosion will often show as a uniform pitting as under atmospheric corrosion. Aggravated pitting as in immersion, such as when acid waters are involved, also are found.

If the entire pipe line is made a cathode, corrosion may be prevented because it occurs only at points where the metal is anodic with respect to the electrolyte. The pipe line to be protected is connected to beds of zinc or magnesium anodes spaced at varying intervals according to the demands as evidenced by a survey of the buried line. The amount of zinc or magnesium required is greatly reduced if the pipe is covered with an insulating coating.

Corrosion is and probably will be a debatable subject. So long as it remains in this category, there will be expressions of opinions as to the causes and the remedies. That which will answer one water corrosion problem will not answer another. By the exchange of ideas and opinions, however, together with actual experience, some day in the future corrosion may become less of a problem.

Magnesium Used for Boilers

By J. A. HOLBROOK
Mechanical Engineer, New York Central System, New York

We have had relatively little personal experience with using zinc electrodes for preventing corrosion in pumps and water lines. Our water lines that are subject to detrimental electrolytic action from external sources are being replaced from time to time by Transite pipe lines, in order to eliminate electrolysis. We have no pumps to my knowledge which are protected by this method.

We do, however, have a few small hot-water tanks and boilers which are protected by electrodes, although we are inclined to use magnesium in preference to zinc as being higher in the electrolytic scale and therefore more effective. Aluminum electrodes can also be used but are somewhat less effective than zinc, being lower in the scale.

In general, the method is reasonably effective in retarding pitting, provided each installation is properly engineered, and of course the electrodes must be periodically inspected and replaced as they become used up.

Removing Ashes from Station Basements

What are the best methods of removing ashes from basements of freight and passenger stations equipped with coal-burning furnaces? To what extent should work-saving facilities to accomplish this task be built into such stations? Explain.

Install Oil Burners

By J. J. HEALY
Supervisor, Bridges and Buildings, Boston & Maine, Boston, Mass.

With the arrival of the 40-hr. week for railroad agents, telegraphers and other non-operating employees many problems were presented to the railroads to keep up their former standard of service to the public. Foremost in these problems was the subject of adequate heating in stations and the consequent attendant duties necessary to maintain the necessary heating facilities.

Even under the former 48-hr. week, agents and telegraphers in stations and freighthouses had difficulty in adequately attending heaters and removing ashes in addition to their other multitudinous duties, and the 40-hr. week only served to accentuate these difficulties. Some railroads assigned section forces to remove the ashes and dispose of them to relieve the agent of this onerous work. Other railroads arranged to have local contractors remove the ashes at stated intervals during the winter season. This latter method appears to be the more economical as sectionmen are required for their more important work of track maintenance.

Work-saving facilities are only a partial answer to the problem and there is essentially a certain amount of manual labor involved in the disposal of the ashes, which cannot be entirely eliminated.

It would appear that the real solution would be the installation of oil-burning equipment in the more important stations and freighthouses, which not only would eliminate the removal of ashes but would also provide heat through thermostatic control sealed to prevent tampering by unauthorized persons during the days when the agent was absent.

At less important locations where the expense of oil-burning equipment is not warranted, contractors or caretakers should handle the removal and disposal of ashes.

Eliminate the Ashes

By O. G. WILBUR
Assistant Engineer of Buildings, Baltimore & Ohio, Baltimore, Md.

From my experience I do not have much to offer the fellows confronted with the problem of hand-

ling ashes, but can only suggest that perhaps the best answer is to eliminate ashes so they do not have to be handled.

Our experience with ash-handling equipment has been very limited. In the larger stations of old design, where steam has not been brought into the building from outside sources and we have depended upon boilers within the building, we have used manual labor to remove ashes.

In the more recently designed passenger and freight stations, in an effort to save labor, we have made boiler installations using fuel other than coal, thus eliminating the necessity of firing the boiler and handling the ashes.

Laying Rail with Two Cranes

What are the advantages and disadvantages of using two cranes for normal rail renewals? When used, how should their operation be organized and coordinated? Explain.

Disadvantages Outweighed

By Track Supervisor

There are four specific purposes for which second crane can be used in a rail-renewal operation. These assignments are: (1) To set out the old rail ahead of the crane handling the new rail; (2) to assist in handling long rails at grade crossings; (3) to remove old material and assist in handling new rail, switches, station platforms and bridges; and (4) to handle all head-end rail-laying equipment to and from the track to clear for trains or for other reasons. In all these operations the added crane is run ahead of the rail-laying crane and normally facing it. To do this the second crane must run backwards most of the time, but, to be "worth it's salt", it must be of the full-revolving type so it can perform all of its functions.

The main advantage of having a second crane to complete assignment No. 1 is that it can quickly set the old rail out of track and leave it workwise as a help in reloading operations and out of the way of following rail-laying forces. In its second assignment at grade crossings, an extra crane eliminates the cutting of the old extra-length rails into pieces—a practice that has often been used to speed up rail laying and to keep rear-end forces from "bunching up" and the head-end forces from "stretching out" too far. Under certain conditions, the use of an additional crane for this assignment eliminates the need for assigning a section gang to prepare the crossing for the rail-laying forces, by removing concrete blocks, certain types of guard rails, etc.

The use of an additional crane in assignment No. 3 is almost economically essential if a large rail-laying organization is to be used to lay rail through an industrial territory replete with switches and crossovers. Even for isolated switches a second crane can remove the old switch and frog material so quickly and place the new material within such easy reach of the following crane that very little "bunching" of forces occurs. For such isolated instances, I have always found it expedient to leave a section gang at the switch to complete the fine adjustments and to attend to the many details necessary in a switch installation if it is to ride well later and if little maintenance is to be expected. It is especially important to remember that in using rail-laying forces to install switches, advance planning must be accurate and complete or the result will be unsatisfactory from both the standpoint of cost and the quality of work obtained.

In carrying out its fourth assignment, the second crane either sets the equipment to the side of the track, or loads it on push cars to be towed to the nearest siding by a motor car. In either case the equipment can be taken care of long before the rail-laying crane has set the last rail in place. This is important because the quicker the assignment is completed, the sooner most of the head-end men can be utilized in "closing-up".

Most of the disadvantages of using a second crane arise under special circumstances that are generally infrequent. However, probably its greatest disadvantage is that it runs backwards most of the time. This requires that special safety precautions be taken to prevent: (1) a collision with other equipment; (2) workmen from being struck; or (3) the derailment of the crane.

Using Steel Caps in Wood Pile Trestles

What are the advantages and disadvantages in using steel beams for caps and stringers in timber pile trestles? What steel shapes are most suitable for this purpose? Explain.

Saves Wood in Short Supply

By R. A. Van Ness

Bridge Engineer, Atchison, Topeka & Santa Fe, Chicago

The Santa Fe started construction of the steel-stringer-and-cap trestle bridge late in 1945, building them almost entirely on main lines. Enough steel was purchased in 1945 and 1946 to build about 30,000 ft. of single-track bridge

Inability to secure a sufficient supply of timber stringers and caps prompted the decision to utilize the steel-stringer-and-cap construction. The trestles have been almost exclusively of the ballast-deck type, only a few being open deck. At the time the steel was purchased, estimates indicated the ballasted and open-deck types would cost respectively $13 and $12 more per lineal foot of trestle than the all-timber-pile trestle. Based on the estimated lives of the part-steel, and all-timber, ballasted-deck trestles, the annual cost of the former over the latter figured only about 14 cents per foot of bridge. The cost of the fabricated steel today would be more than double the price paid in 1945 and 1946, and thus there would be a much wider spread of costs of the two types of trestles.

The caps are made from 14-in., wide-flange beams 14 ft. long, and weigh 87 lb. per foot. They are supported by six timber piles, to which they are secured by lag screws extending through the bottom flanges and into prebored holes in the tops of the piles.

The stringers are 12-in., wide-flange beams 13 ft. 11 in. long, and

weigh 72 lb. per ft., being designed for E-65 loading and 60 per cent impact. The beams rest on lugs welded to the top flanges of the caps, with a common keeper plate at interior caps. The deck timbers are 6 in. deep and 14 ft. long. There is 8 in. of ballast under ties.

The primary advantage of the steel-stringer-and-cap, timber-pile trestle was that it relieved at a small annual-cost premium the pressure on a low stock of timber stringers and caps, which could not be readily built up. The construction lends itselft very well to driving a second set of piles.

The only disadvantage of this type of trestle was the slight additional annual cost over that of the all-timber, ballasted-deck trestle. In this extra cost was figured the expense to protect the steel. Today the high cost of steel rules out this type of construction unless it would have to be considered due to another shortage of timber stringers and caps.

Feeding Snow-Fighting Forces

What are the easiest and best ways to feed snow-fighting forces kept on duty long hours at terminals? At outlying interlocking plants ? On line of road? Explain.

Follow Preconceived Plan

By A. Drager
M/W Storekeeper, Central Railroad of New Jersey, Elizabethport, N. J.

A general plan to feed snow-fighting forces should be worked out every year just before winter. This plan should include a list of the eating places, such as diners, restaurants, delicatessens, grocery stores and food stores in the vicinity of terminals, interlocking plants and on line of road. Section foremen should be consulted in connection with the preparation of this list as they often know of places where food may be obtained on short notice. It is advisable to contact the proprietors of these establishments to ascertain what food they generally have on hand, how many persons they can feed at one time, and other details of handling anticipated emergencies. The facts determined in these contacts should be incorporated in the snow program to be available when needed. One person should be assigned to each locality to handle the various details.

If at all possible, it is desirable to serve the forces fighting snow at terminals a substantial and nutritious meal in the evening at a nearby eating place. The men should be served in relays, the number to be served at one time depending on how many men can be released as well as on the number of men the eating place can accommodate. The eating place should be notified in advance as to how many men are to be fed, and the time the food is to be ready. It is important that the men are released at this agreed time. Second portions should be given to any of the men that request them.

If the eating place is a considerable distance away from the terminal, transportation should be provided to and from the restaurant. If food is required at night, and no eating places are open, a quantity of good, substantial sandwiches should be prepared early in the evening and a supply of fruit such as bananas, apples and pears obtained. A variety of sandwich fillings should be provided, such as cheese, ham and bologna. Each man should get a bag of sandwiches, fruit and also a piece of cake. Coffee should be prepared in milk cans and kept warm until it is to be served in paper cups. The same procedure should be followed at breakfast time, if the forces are not relieved at that time.

The method of feeding men fighting snow at interlocking plants on line of road varies according to the location and the number of men to be fed. A person should be designated to scout the nearby country beforehand to find out where meals can be obtained. Often it will be found that a nearby grocery store will be glad to prepare meals or sandwiches and coffee. If it is impossible to obtain food in the immediate vicinity it must be brought in from the nearest village or town, by car, truck or locomotive.

Substantial food, served at the proper time, will create goodwill and result in a better work output. In all cases, it is a great help to have a general plan worked out beforehand, allowing the foreman to change the details to suit local conditions.

Hungry Men No Good in Snow

By George S. Crites
Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

Snow-fighting forces need plenty of good hot food. Cold and exercise use up human fuel and a hungry man is little good in a snow storm. Four-hour feeding intervals pay in labor production under such trying conditions.

Where restaurants or commissaries under company control are available in terminals, they should be staffed in an emergency for putting up quantities of food and drink as they may be called for. These can be loaded into closed trucks and delivered to field workers, including those at interlocking plants. Remote places must not be overlooked as they may be the most vulnerable.

If a company-controlled food supply is not available, outside restaurants or commissaries should be contacted in advance for the necessary food and then called for at regular intervals by trucks.

For outlying interlocking plants and for forces on line of road, local restaurants are contacted in advance for food supplies and, when possible, trucks call for and deliver the food as needed. In some places, food and supplies may have to be handled on trains and or well-stocked dining and cook cars may have to be sent out.

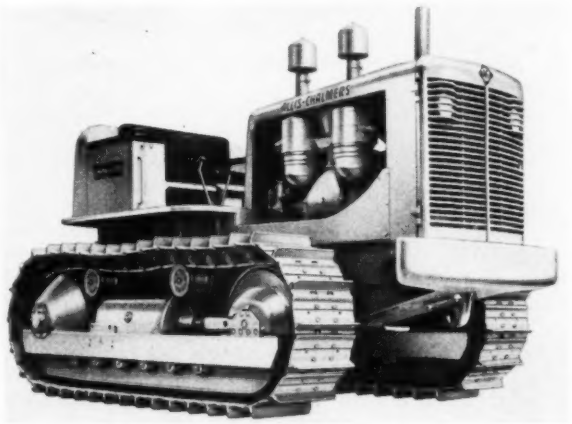
If it is necessary to burden scheduled trains with food delivery, arrangements should be made in advance to handle about one day's supply of food at a time on the train best able to handle it without too much loss of time. In such cases, facilities for keeping the food properly must be provided at the point of delivery.

In territories where snow is a burden, responsible supervision must plan for food in advance the same as they plan for labor and equipment. Written instructions for the delivery of food is outlined in the snow program for the benefit of the office forces so this important matter can be handled competently while the supervision is on the snow-fighting front.

PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 27.)



One of the new Allis-Chalmers tractors is the HD-15 shown here

TWO NEW TRACTORS BY ALLIS-CHALMERS

THE Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has added two new models to its line of crawler tractors. One of these, known as the HD-9, weighs 18,500 lb. and has a drawbar horsepower rating of 70. The other, called the HD-15, weighs 27,500 lb. and develops 102 hp. at the drawbar. Both units are powered by General Motors Diesel engines, and both have six speeds forward and three in reverse.

Features of the new tractors include a constant-mesh transmission that permits the operator to shift from forward to reverse at any speed by one movement of a single control lever; unit-assembly construction which permits servicemen to remove and reinstall any unit in the power train — engine, clutch, transmission, steering clutch and final drive—without disturbing related assemblies; and spring-loaded seals for retaining grease in the final drive, truck wheels, idlers and support rollers, which are reported to permit operation for 1,000 hr. without further lubrication. Other features contributing to ease and efficiency of operation include an adjustable seat, boosted steering, convenient grouping of controls, self-energizing brakes, and a tapered cowl for better visibility.

POWER SWEEPER

THE G. H. Tennant Company, Minneapolis, Minn., has developed a power sweeper specially designed for fast sweeping of station platforms, ramps, waiting rooms, shops, and similar areas. Although less than 29 in. wide, and operated by one man, the machine is reported to have a sweeping capacity of more than 43,500 sq. ft. of area per hour.

For sweeping, the unit incorporates a combination brush and vacuum system. A brush, 24 in. wide, revolves inside a sealed compartment and hurls dirt and debris into an enclosed, built-in, "floating" type hopper. At the same time a vacuum fan draws dust into a heavy fabric bag.

The machine, driven by a 4.4-hp. air-cooled engine, is equipped with a two-speed transmission permitting speeds up to 8 m.p.h. for open areas and as low as 2 m.p.h. for safe handling in narrow aisles or in crowded areas. Its sweeping action is said to be as efficient at low speed as at higher speeds. The unit also has a reverse gear.

In operating the machine the operator lowers the brush with a foot pedal, shifts to high or low, and presses the accelerator pedal. A centrifugal-type automatic clutch

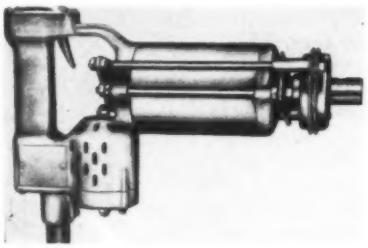
The Tennant power sweeper incorporates a combination brush and vacuum system

For additional information on any of the products described on this page, use postcards, page 27.

engages when the engine reaches a preset speed. The sweeper is equipped with front-wheel automobile-type steering, both foot and parking brakes, and sealed ball and roller bearings throughout. Various types of brushes are available. One of these is a rotary side-sweeping brush for cleaning flush with walls, under guard rails, etc.

ELECTROMAGNETIC HAMMER DRILL

FEATURING light weight (11¾ lb.) and automatic bit rotation, a new electromagnetic hammer drill —the Model No. 10-RO—for hole drilling in concrete, brick or stone, has been added to the line of electric hammers manufactured by the Syntron Company, Homer City,

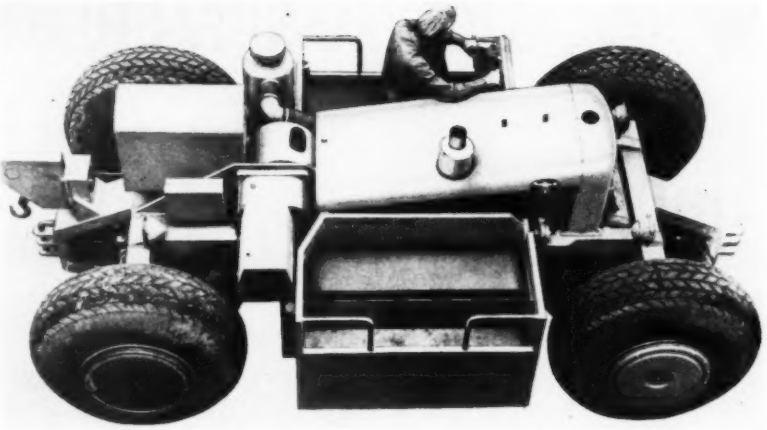


The Syntron electromagnetic hammer drill with automatic bit rotation

Pa. The automatic rotation of the drill bit, which is reported to speed up hole drilling and reduce operator fatigue because it eliminates the need of turning the drill chuck manually, is accomplished by a rubber rachet mechanism actuated by the recoil of hammer's piston.

NEW PRIME MOVER WITH ELECTRIC DRIVE

WHEN certain critical materials, such as copper, become more plentiful, R. G. Le Tourneau, Inc., Peoria, Ill., will begin large-scale production of a Diesel-electric prime mover, called the Tournatow, with a four-wheel drive that requires no clutches, transmission or differential. Each of the four wheels is driven, through a gear arrangement, by an individual electric motor which receives current through flexible wires from a d-c generator powered by a 186-hp. Diesel engine. Another generator, an a-c unit, supplies power for an electric steering mechanism.



Each wheel of the Tournatow is driven by an individual electric motor

In operating the Tournatow, a throttle for the Diesel engine is first advanced to turn the generators at the required speed. Then the machine is operated, either forward or in reverse, by rotating a controller similar to the type used on street cars, which regulates the flow of current from the generator to the wheel motors. After the engine throttle has been opened no further regulation of it is necessary.

Under push-button control, the machine can be steered by the front wheels alone, the rear wheels alone, or by the front and rear wheels simultaneously. The front and rear wheels can be steered in opposite directions if a short radius turn is desired, or they can be steered in the same direction to provide an oblique movement.

ELEVATING GRADER

EARTHMOVING jobs requiring casting or loading can now be carried out by the Caterpillar No. 12 or No. 112 motor grader by mounting on the unit an elevating-grader attachment manufactured by the Ulrich Products Corporation, Roanoke, Ill. Called the Domor, the attachment consists of a heavy rigid plow beam, a 30-in. disk and a 42-in. carrier with a normal belt speed of 400 ft. per min.

The standard carrier is 19 ft. long, which provides ample lift for loading into trucks. For casting work, a 3-ft. section can be removed if desired. The carrier is lifted by cables powered by the regular blade controls of the motor grader.

(Please turn to page 66)

A Caterpillar No. 12 motor grader equipped with the Domor elevating grader

B.&O. KEEPS SWITCH POINTS SNOW-FREE FOR 3½¢ PER HOUR FOR POWER

After installing G-E Calrod* electric snowmelters, the B. & O. kept switches free of snow and ice at an average power cost of 3½¢ per switch point per hour last winter. 112 switch points at its Willard, Ohio classification yard were equipped with these heaters. Want the full story on Calrod* snowmelters? Write your nearest G-E Sales Office. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

*Reg. U.S. Pat. Off.

Shop Motors and Controls • Shop Testing Equipment • Undercar Power Plants • Lighting Systems • Electric Heaters • Signal Power Systems • Power Distribution Systems • Electric and Diesel-Electric Locomotives.

You can put your confidence in—

GENERAL ELECTRIC

152-15

For additional information on any of the products described on this page, use postcards, page 27.

WOOD PRESERVATIVES

THE Zone Company, Fort Worth, Tex., has announced a new wood preservative and the improvement of another. The new product is Zoprex—a colorless wood preservative based on pentachlorophenol. The improved product is the company's A-P (asphalt-preservative) paint, to which pentachlorophenol has been added.

Zoprex is recommended by the company for protection of wood surfaces which are to be painted. The material is easily and quickly applied by an ordinary bristle brush, and is reported not to "bleed" through paint coats of any color applied over it.

According to the company, the asphalt-preservative paint, with the addition of penta, now offers two-way protection. When the product is applied to wood surfaces, the asphalt seals the surface against moisture, while the penta prevents the development of fungi and wood-attacking insects.

Above—The Caterpillar DW 21 equipped with a No. 21 scraper. Right—The tractor-wagon combination made up of a DW 20 tractor and a W 20 wagon

CATERPILLAR EARTHMOVING MACHINES

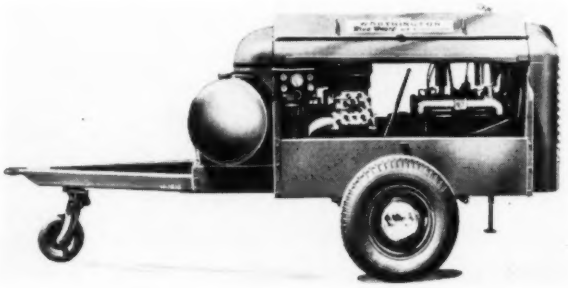
TWO new high-speed, long-haul and big-capacity earth-moving machines have been announced by the Caterpillar Tractor Company, Feoria, Ill. One of these is a four-wheel Diesel tractor-wagon combination made up of a DW 20 tractor and a W20 wagon. The other consists of a two-wheel Diesel prime mover—the DW 21—equipped with a No. 21 scraper. The DW 20 tractor may also be equipped with a No. 20 scraper and a No. 20S bulldozer in addition to the W20 wagon. Both prime movers have the new six-cylinder Caterpillar Diesel engine which has a peak capacity of 275 hp.

The DW 20 four-wheel tractor has five speeds forward (from 2.88 m.p.h. to 26.60 m.p.h.) and one in reverse (3.72 m.p.h.). The bottom-dump W20 wagon has a struck capacity of 17 cu. yd. and a heaped capacity of 25 cu. yd. The doors are hydraulically controlled and have positive mechanical locks. The No. 20 scraper has a heaped capacity of 19½ cu yd., which may be increased to 22½ cu. yd. by the addition of 12-in. side boards.

The two-wheel DW 21 has five speeds forward, ranging from 2.16 m.p.h. to 20 m.p.h. Reverse speed is 2.79 m.p.h. The cable-controlled No. 21 scraper has a heaped capacity of 22½ cu. yd. with 12-in. sideboards.

AIR COMPRESSOR IMPROVED

AN improved 105-c.f.m. portable air compressor, which is said to be 300 lb. lighter, 10 in. shorter, 4 in. lower and more maneuverable than previous models, has been announced by the Worthington Pump & Machinery Corp., Construction Equipment Division, Holyoke, Mass. The principal features of the new model include a retractable third wheel; an underslung spring-mounted undercarriage with heavy-duty commercial 15-in. trailer tires; a simple retractable support leg; a new-style unit core radiator with pressure cap to prevent boiling and to provide better engine operation at high temperatures and altitudes; and a new carburetor with fixed jets.



The improved Worthington 105-c.f.m. compressor

READE EST 1883

Now FOR 1951!

HERBICIDOL

An Improved Arsenical Vegetation Destroyer

INSURED

Against

PROPERTY DAMAGE LIABILITY
(PROPERTY)

PRODUCTS LIABILITY
(CATTLE — LIVESTOCK)

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THE MONTH'S NEWS

Happenings among the railways — the associations — the suppliers

Changes in Railway Personnel

General

A. W. Schroeder, chief engineer of the Chicago & Eastern Illinois, has been appointed superintendent, with headquarters as before at Danville, Ill.

M. I. Dunn, general superintendent on the Chesapeake & Ohio at Peru, Ind., and an engineer by training and experience, has been promoted to assistant superintendent of freight transportation, with headquarters at Richmond, Va.

George D. Hughey, general manager of the Delaware & Hudson, and an engineer by training and experience, has been elected vice-president and general manager, with headquarters as before at Albany, N. Y.

Harold J. McKenzie, chief engineer of the Southern Pacific Lines in Texas & Louisiana, has been appointed executive vice-president of the St. Louis Southwestern (Cotton Belt), a subsidiary of the Southern Pacific Lines. He will have his headquarters at St. Louis, Mo.

H. J. McKenzie

A native of Houston, Tex., Mr. McKenzie was graduated from the Texas Agricultural and Mechanical College in 1927, and completed three years of postgraduate work at the Houston Engineering College. He entered railway service with the Southern Pacific Lines in 1926 while still in school, and has held the positions of draftsman, chief draftsman, assistant to chief engineer, assistant chief engineer and chief engineer.

Neil D. Hyde, assistant to vice-president of the New York Central's Lines West of Buffalo, with headquarters at Chicago, and an engineer by training and experience, has been promoted to assistant to vice-president in charge of operations and maintenance, at New York.

Engineering

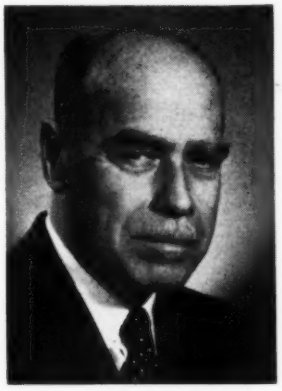
Lee A. Loggins, assistant chief engineer of the Southern Pacific Lines in Texas and Louisiana, has been promoted to chief engineer, with headquarters as

Lee A. Loggins

before at Houston, Tex. He succeeds **H. J. McKenzie,** whose appointment as executive vice-president of the Cotton Belt is announced elsewhere in these columns. **B. M. Stephens, Jr.,** assistant to chief engineer, succeeds Mr. Loggins as assistant chief engineer, and is succeeded by **Ben F. Biaggini, Jr.,** senior assistant engineer. Promoted to succeed Mr. Biaggini is **Carl E. Helmle,** industrial engineer, who in turn, is succeeded by **James F. Scheumack,** assistant bridge and building supervisor on the Houston division.

Mr. Loggins, a native of Ennis, Tex., began his railroad career as a coppersmith helper in the Southern Pacific shops there in 1920. He continued working for the road while attending the University of Texas, from which he was graduated with a Bachelor of Science degree in civil engineering. Since graduation he has held various positions ranging from chainman to assistant chief engineer.

F. W. Campbell, whose promotion to district engineer on the Canadian National, at Montreal, Que., was reported in the December issue, was born in Toronto, Ont., and entered the service of the C. N. R. in May, 1926, as an instrumentman, at Capreol, Ont. Later



F. W. Campbell

he served as assistant engineer at Hornepayne, Ont., and at St. Thomas. Released from the armed forces of Canada, he resumed his railway career in January, 1945, as assistant division engineer at Belleville, Ont., and, in the fall of 1946, was promoted to division engineer, the position he held at the time of his recent appointment.

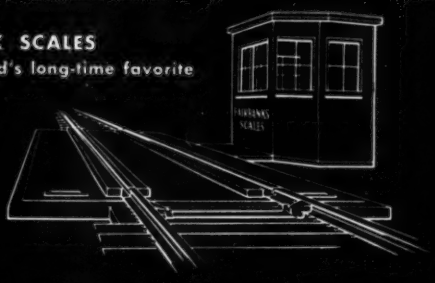
John F. Swenson, division engineer on special duty in the office of the chief engineer maintenance of way of the Pennsylvania, at Chicago, has retired after more than 39 years of service.

W. H. MacIlroy, assistant division engineer on the Canadian National at Prince Rupert, B. C., has been promoted to division engineer, Portage-Brandon division, with headquarters at Winnipeg, Man., succeeding **G. M. Pearston,** who has retired.

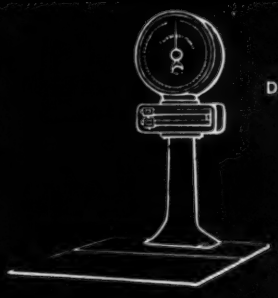
Lawrence E. Rundell, roadmaster on the Atchison, Topeka & Santa Fe, has been appointed acting division engineer of the Eastern division, with headquarters at Emporia, Kan., succeeding **Herbert L. Miller,** who has been assigned to other duties.

(Please turn to page 70)

TRACK SCALES
The railroad world's long-time favorite

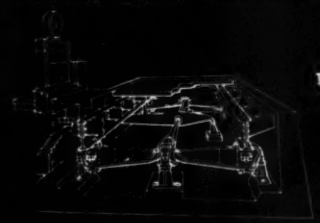


TURBINE PUMPS
Oil or water lubricated models



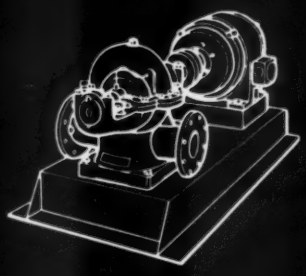
WAREHOUSE SCALES
Dial scales for warehouse weighing

SAND STATIONS
with new, fast-action, easy-to-use sand nozzles.



TRUCK SCALES
True weight measurement for years of off-track operation

CENTRIFUGAL PUMPS
Also positive displacement types for fueling stations



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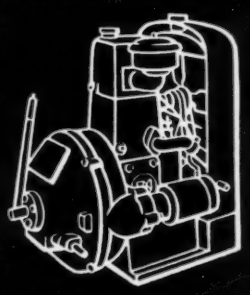
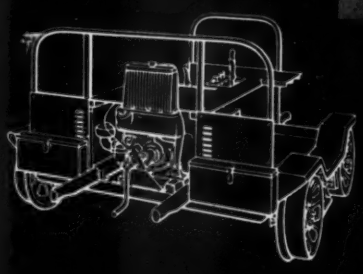
DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • PUMPS • SCALES
HOME WATER SERVICE AND HEATING EQUIPMENT • RAIL CARS • FARM MACHINERY



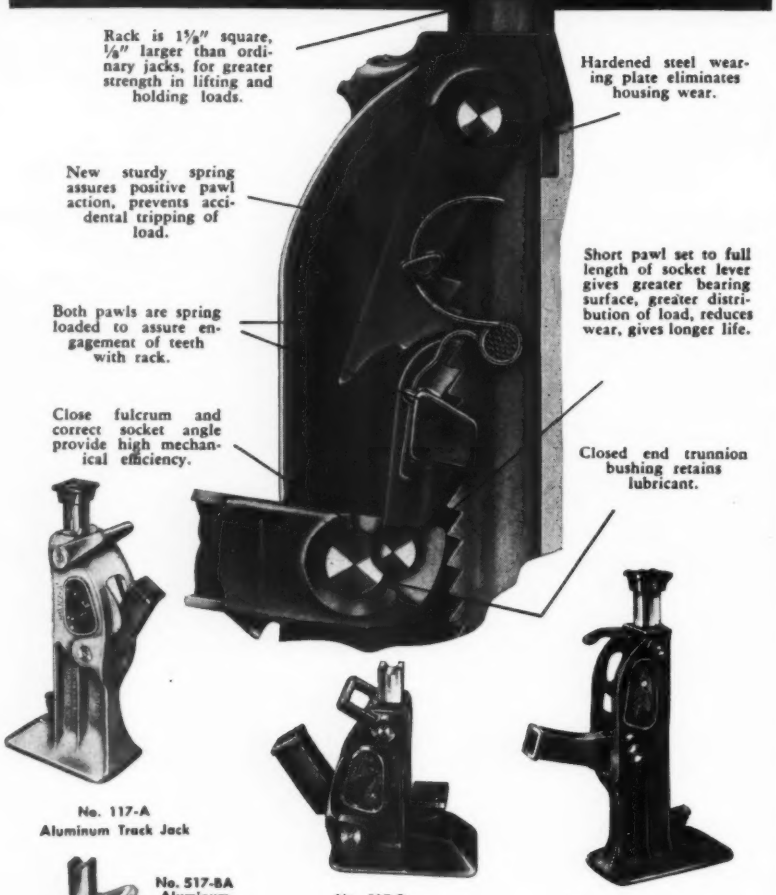
GENERATING SETS
Gasoline and diesel engine models

RAIL CARS
Complete gang and inspection equipment, including the new model 101 with immediate reverse and other safety features.



Why... DUFF-NORTON JACKS

are Best for Track Maintenance


Rack is 1⅛" square, ⅛" larger than ordinary jacks, for greater strength in lifting and holding loads.
Hardened steel wearing plate eliminates housing wear.
New sturdy spring assures positive pawl action, prevents accidental tripping of load.
Short pawl set to full length of socket lever gives greater bearing surface, greater distribution of load, reduces wear, gives longer life.
Both pawls are spring loaded to assure engagement of teeth with rack.
Close fulcrum and correct socket angle provide high mechanical efficiency.
Closed end trunnion bushing retains lubricant.

No. 117-A Aluminum Track Jack

No. 517-B Surfacing Jack

No. 117 Track Jack

No. 517-BA Aluminum Surfacing Jack

Yes . . . the features illustrated and described above are the reasons why Duff-Norton Jacks meet exacting requirements of railroad track maintenance crews. For greatest dependability, safety and economy—always specify Duff-Norton.

Write today for Bulletin AD14-Q.

THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA. CANADIAN PLANT, TORONTO 6, ONT.

"The House that Jacks Built"

Railway Personnel (Cont'd)

H. K. Morrison, whose retirement as district engineer on the Canadian National was announced in the December issue, was born at Dartmount, N. S., in 1887. He began his railway career as a chainman for the Halifax and South-

H. K. Morrison

western (now C. N. R.) in 1901, later serving with the Quebec & Lake St. John (now C. N. R.). In 1905 he joined the Canadian Northern (now C. N. R.), serving successively as topographer, leveller, transitman, engineer, and resident engineer at Pembroke, Ont. After overseas service with the C. E. F. during World War I, Mr. Morrison returned to the Canadian Northern as division engineer at Hornepayne, Ont., transferring to Montreal, Que. in 1920, and, following the formation of the Canadian National, served as assistant engineer at various points in Quebec and Ontario. He was promoted to district engineer for the survey and construction of the Rouyn-Senneterre branch line in 1936, and became resident engineer on the Montreal terminal development in 1939. He was advanced to terminal engineer at Montreal in 1942, and to district engineer in 1946, holding the latter position until his recent retirement.

Nicholas V. Back has been appointed engineer maintenance of way of the Toronto, Hamilton & Buffalo, with headquarters at Hamilton, Ont.

G. H. Hoganson, who has been promoted to assistant division engineer of the Moncton division of the Canadian National, with headquarters at Moncton, N. B., as announced in the December issue, was born at Halifax, N. S., and entered the employ of the C.N.R. as a junior assistant engineer in 1947, in the research and development department at Montreal, Que. In February, 1949, he was made an instrumentman at Campbellton, N. B., and in November of the same year was appointed assistant engineer in the regional engineering department at Moncton, which position he held at the time of his recent appointment.

(Please turn to page 72)

HOMELITE

HIGH CYCLE POWER HITS THE ROAD

to speed repairs and cut your maintenance costs

The Homelite Dual Purpose Generator is really high-balling its way into the hearts of railroad maintenance men. Because this lightweight, carryable, gasoline engine-driven generator is the *only* generator that can supply the proper power for the new cost-cutting high cycle power tools . . . *and at the same time* . . . provide 110 volt power for operating standard universal tools plus floodlights. Yes, and it can do it anywhere a job has to be done . . . even in the remotest power-poor areas.

The High Cycle Way is the Low Cost Way

High cycle tools such as grinders, impact wrenches, drills, concrete vibrators, chain saws, etc. are faster-acting, lighter-weight, easier to handle. With them, a man can do more work in less time than with standard universal tools. What's more . . . high cycle power tools are simpler in design, more trouble-free, easier to keep in perfect operating condition. Write, and Homelite representatives will gladly demonstrate, on the job, the savings in time and labor you can make with high cycle tools operated by the famous Homelite Dual Purpose Generator. Write today.

CARRYABLE

PUMPS • GENERATORS • BLOWERS • CHAIN SAWS

PERFORMANCE · DEPENDABILITY · SERVICE

HOMELITE

CORPORATION

201 RIVERDALE AVENUE • PORT CHESTER, N. Y.

Railway Personnel (Cont'd)

J. H. Sawyer, Jr., assistant engineer on the Southern, with headquarters at Cincinnati, Ohio, has been appointed engineer of bridges on the Chicago Great Western, with headquarters at Chicago, succeeding **R. A. Nelson,** engineer of bridges and buildings, who has been appointed engineer of buildings.

E. C. B. MacNabb, division engineer on the Canadian Pacific at Moose Jaw, Sask., has been appointed assistant district engineer at Vancouver, B. C., to succeed **K. A. Truman,** who has been advanced to special engineer at Winnipeg, Man. **R. E. Grant,** roadmaster at Consul, Sask., has been promoted to division engineer to succeed Mr. MacNabb.

I. A. Moore, assistant chief engineer of the Chicago & Eastern Illinois, has been promoted to chief engineer, with headquarters as before at Danville, Ill., succeeding **A. W. Schroeder,** whose appointment as division superintendent is announced elsewhere in these columns. **H. Huffman,** general roadmaster, with headquarters at Danville, has been promoted to engineer, maintenance, with the same headquarters.

BALLAST IS SCREENED BY CONTRACT — ELIMINATING INVESTMENT BY RAILROADS IN THIS ONE-OPERATION EQUIPMENT . . .

Stone ballast cleaned by the Speno method is thoroughly cleaned because it is screened twice. In order to obtain a thorough cleaning, two passes are necessary to restore the ballast to as clean a condition as when it was originally placed in the track. The two passes are accomplished in less time than a single pass by other mechanical methods.

Preferably, the ballast is cleaned ahead of a general track raise, and under the Speno method, no cribbing is necessary. Because of the drainage that the Speno method attains, the cleaning lasts from one general raise until it is time for another general raise, normally over a period of from three to six years, depending on conditions.

Speno equipment, working under traffic without interference with railroad operation, (the track adjacent to the one being worked is not fouled by our equipment in working position) easily keeps ahead of track raising programs.

The high production and low cost of this service are worthy of consideration.

FRANK SPENO RAILROAD BALLAST CLEANING CO. INC.

306 North Cayuga Street — Ithaca, New York

George L. Sitton, Jr., assistant division engineer on the Southern at Birmingham, Ala., has been promoted to division engineer at Selma, Ala., succeeding **Milton P. Oviatt,** who has been transferred to Hattiesburg, Miss. **George A. McRoberts,** assistant division engineer at Louisville, Ky., has been transferred to Birmingham to succeed Mr. Sitton, and **Clyde A. Stephenson,** track supervisor at Ludlow, Ky., has been promoted to assistant division engineer to replace Mr. McRoberts at Louisville.

James A. Blalock, assistant division engineer on the Richmond, Fredericksburg & Potomac, has been advanced to division engineer, with headquarters as before at Richmond, Va., succeeding **James C. DeJarnette,** whose appointment as chief engineer was announced in the December issue. Mr. Blalock was born at Richmond on March 20, 1915, and graduated in civil engineering from the Virginia Polytechnic Institute in 1937. He entered railway service

James A. Blalock

on June 14, 1937, as an engineering apprentice on the Pennsylvania at Philadelphia, Pa., later being transferred to Perryville, Md. In December, 1937, he was appointed assistant on the engineering corps at Perryville, and later served in that capacity at Baltimore, Md., and Norristown, Pa. He was promoted to assistant supervisor of track at Columbus, Ohio, in February, 1941, later being transferred to Pittsburgh, Pa. In December, 1941, Mr. Blalock went with the R. F. & P. as assistant supervisor of track at Fredericksburg, Va., later being transferred to Richmond. In August, 1944, he was appointed junior supervisor at Richmond, and in January, 1945, he was advanced to supervisor of track at Alexandria (Potomac Yard), Va. In July, 1945, Mr. Blalock was promoted to assistant division engineer at that terminal, being transferred to Fredericksburg in September, 1946, and in April, 1948, to Richmond.

F. F. Schilt, assistant division engineer on the Baltimore & Ohio, has been promoted to division engineer, with headquarters as before at Grafton, W. Va., to succeed **J. H. Lindsay,** who

has been transferred to the Baltimore division, west end, at Baltimore, Md., to replace **F. W. Bailey.** Mr. Bailey, in turn, has been moved to the Buffalo division, west end, with headquarters at Punxsutawney, Pa. **C. E. Jackson** has been appointed division engineer at Newark, Ohio, replacing **J. T. Hoelzer,** who has been transferred to Cincinnati, Ohio.

Track

A. Daem, roadmaster on the Calgary division of the Canadian National, retired recently after 33 years of service.

Walter Welch has been appointed assistant roadmaster on the Houston division of the Southern Pacific Lines in Texas and Louisiana, succeeding **G. F. Prude,** whose appointment as assistant bridge and building supervisor is announced elsewhere in these columns.

H. F. Curtis has been appointed roadmaster on the Atchison, Topeka & Santa Fe, with headquarters at Amarillo, Tex., succeeding **F. J. Myers,** who has been transferred to the New Mexico division, with headquarters at Albuquerque, N. Mex. Mr. Myers replaces **C. L. Heimback,** who has been recalled to military service.

Francis L. Rees has been appointed roadmaster on the Enid, Stillwater and Cushing districts of the Atchison, Topeka & Santa Fe, succeeding **Lawrence E. Rundell,** whose appointment as acting division engineer at Emporia, Kan., is announced elsewhere in these pages.

David Watterau, student apprentice in the office of the chief engineer maintenance of way and structures of the Southern, at Cincinnati, Ohio, has been promoted to track supervisor at Selma, Ala. **Robert Widener,** section foreman at Knoxville, Tenn., has been advanced to assistant track supervisor at John Sevier, Tenn., and **Rufus R. Pearce,** section foreman at Plainville, Ga., has been advanced to assistant track supervisor at Rockmart, Ga.

Lawrence B. Cann, Jr., assistant supervisor of track on the Richmond, Fredericksburg & Potomac, has been promoted to the newly-created position of supervisor of track, with headquarters as before at Richmond, Va. He assumes the duties of **J. A. Blalock,** assistant division engineer, whose advancement to division engineer is noted elsewhere in these columns. Mr. Cann was born in Richmond on January 19, 1920, and received a Bachelor of Science degree in civil engineering from the Virginia Military Institute on June 6, 1941. He entered the service of the R. F. & P. as a junior engineering aide at Alexandria (Potomac Yard), Va., on February 1, 1947, advancing to senior engineering aide on August 1 of that year. On December 1, 1949, he was appointed assistant supervisor of track at Richmond, and served in that capacity until his recent promotion.

(Please turn to page 74)

"BORASCU* SOLVES THE WEED PROBLEM ABOUT TIMBER BRIDGES AND TRESTLES"

BORASCU* *treatment proved more effective—and lasting—than shovel cutting or hand scalping . . . resulted in savings of as much as $1.66 per lineal foot of trestle per year for this class of work* . . . so reports one major road; other roads tell of similar benefits from their use of BORASCU*. To reap such important savings, have *your* section hands apply safe, noncorrosive, low-priced BORASCU* about your bridges, trestles, tie piles and buildings now . . . it's the easy, thrifty way to destroy fire-hazardous weeds and grasses!

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Railway Personnel (Cont'd)

Clyde M. Powell, tie inspector on the Richmond, Fredericksburg & Potomac, has been appointed assistant supervisor of track of District 2, with headquarters at Fredericksburg, Va.

C. L. Spitzer, whose promotion to supervisor of track on the New York Central at Bryan, Ohio, was reported in the December, issue, was born at Somersett, Ohio, on June 19, 1900. In his career on the N. Y. C., which began in 1917, he has served as section laborer, section foreman, extra-gang foreman and assistant supervisor of track. He held the latter position at the time of his promotion.

Robert Wright, whose promotion to roadmaster on the New York, Chicago & St. Louis at Tipton, Ind., was reported in the December issue, was born at Cleveland, Ohio, on December 2, 1909. He began service with the Nickel Plate in 1928, and prior to his promotion to roadmaster, he had worked successively as rodman, carpenter helper, extra-gang timekeeper, section laborer, track patrolman, section foremen, general track foreman and assistant roadmaster.

Jack W. Conroy, whose promotion to roadmaster on the Atchison, Topeka & Santa Fe, with headquarters at Parker, Ariz., was noted in the November issue, was born in Sacramento, Cal., on December 21, 1914, and was graduated from the University of New Mexico in 1938. Mr. Conroy began his railroad career with the Santa Fe in December, 1941, as a bridge inspector at Los Angeles, Cal. In October, 1942, he was appointed transitman at Winslow, Ariz., and in November, 1946, was advanced to track supervisor, with headquarters at Grants, N. Mex., serving in that capacity until his recent promotion.

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Bridge and Building

J. A. Campbell, assistant master carpenter on the Pennsylvania, with headquarters at Indianapolis, Ind., has been transferred to Columbus, Ohio, succeeding **J. D. Moore,** who, in turn, succeeds Mr. Campbell at Indianapolis.

G. F. Prude, assistant roadmaster on the Southern Pacific Lines in Texas and Louisiana, has been appointed assistant bridge and building supervisor on the Houston division, succeeding **James F. Scheumack,** whose appointment as industrial engineer is reported elsewhere in these columns.

Obituary

John C. Holden, retired district engineer of the Canadian Pacific, died recently.

Roscoe C. Young, retired consulting engineer of the Lake Superior & Ishpeming, died recently.

Robert E. Lembcke, assistant engineer on the Texas & Pacific at Ft. Worth, Tex., died recently at Chickasha, Okla.

James A. MacLeod, chief engineer of the Savannah & Atlanta, at Savannah, Ga., died on December 9, at the age of 59.

D. M. McKenzie, retired bridge and building master on the Canadian National, died recently at Vancouver, B. C., at the age of 65.

Fred Lavis, retired consulting engineer and transportation authority, died on November 24, at Phoenix, Ariz., at the age of 79.

Lawrence E. Thornton, superintendent on the Baltimore & Ohio Chicago Terminal, and formerly assistant division engineer on the Gulf, Mobile & Ohio, died on November 21, at St. Luke's hospital in Chicago.

F. A. Matthews, retired supervisor of track on the Chesapeake & Ohio, died at Columbus, Ohio, on October 16, at the age of 80, and **Warren Spencer,** also a retired supervisor of track, died at Lowell, Mich., on October 22, at the age of 84.

Robert S. Gutelius, division engineer on the Delaware & Hudson, with headquarters at Oneonta, N. Y., died suddenly at his home on December 2, 1950, at the age of 54.

Association News

Bridge and Building Association

When the Executive committee met at the Chicago Engineers' Club on the morning of December 4 it had a full day's work ahead of it. With W. A. Huckstep, president of the association, in charge, the group considered such matters as the problem of getting new members, the publishing of a News Letter and of the 1950 Proceedings, and discussed preliminary plans for the 1951 convention. However, the principal item of business was the selection of the personnel—chairmen, vice-chairmen and members—of the eight committees that are to prepare reports for presentation at the next convention.

Roadmasters' Association

Under the direction of President C. Halverson the Executive committee met at the Chicago Engineers' Club on December 11 to discuss routine business

(Continued on page 76)

Meetings and Conventions

American Railway Bridge and Building Association—Elise LaChance, Secretary, 431 S. Dearborn Street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 13-15, 1951, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—Annual meeting, April 24-26, 1951, Stevens Hotel, Chicago. H. L. Dawson, Secretary-treasurer, 839 Seventeenth Street, N. W., Washington 6, D. C.

Bridge and Building Supply Men's Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—Next meeting January 27, 1951. E. C. Patterson, Secretary-treasurer Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

National Railway Appliance Association—Robert A. Carr, Secretary, 310 South Michigan avenue, Chicago 4; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association — Annual meeting September 25-27, 1951, Netherland Plaza Hotel, Cincinnati, Ohio. Roy M. Edmonds, Secretary-treasurer, 912 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago, 5.

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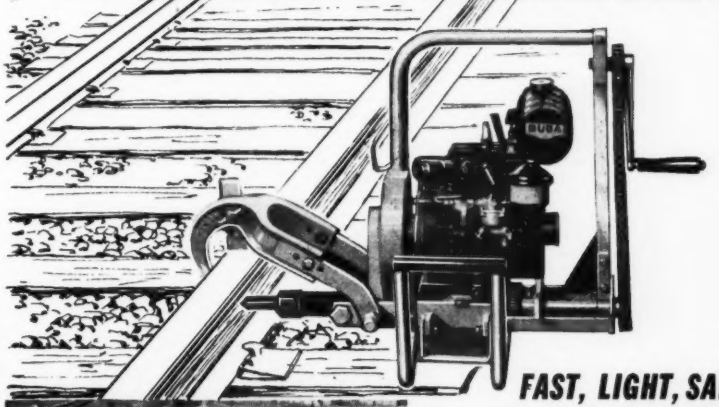

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and make preliminary plans for the 1951 convention. The business transacted included the formulation of a membership drive and the publication of a News Letter and of the 1950 Proceedings. After these matters had been disposed of the committee got down to the principal business at hand which was the organization of the six committees that are to prepare technical reports for presentation at the convention in September of this year. From the large number of members who had volunteered their services the personnel of these committees—chairmen, vice-chairmen and members—was selected without difficulty.

Metropolitan Maintenance of Way Club

The annual luncheon meeting of the club—held at the Hotel Shelburne, New York, on December 7—was attended by 141 members and guests. A brief and informal talk on "Looking ahead with A.R.E.A.," by Neal D. Howard, secretary of the American Railway Engineering Association, Chicago, served as an introduction to the main feature of the meeting—an address entitled, "Past Developments and Future Possibilities in Maintenance-of-Way Research," which was given by Gerald M. Magee, research engineer of the Association of American Railroads, Chicago.

The next meeting will be held at the Shelburne on Tuesday, February 20, at 6:30 p.m. Details of the program will be announced later.

Maintenance of Way Club of Chicago

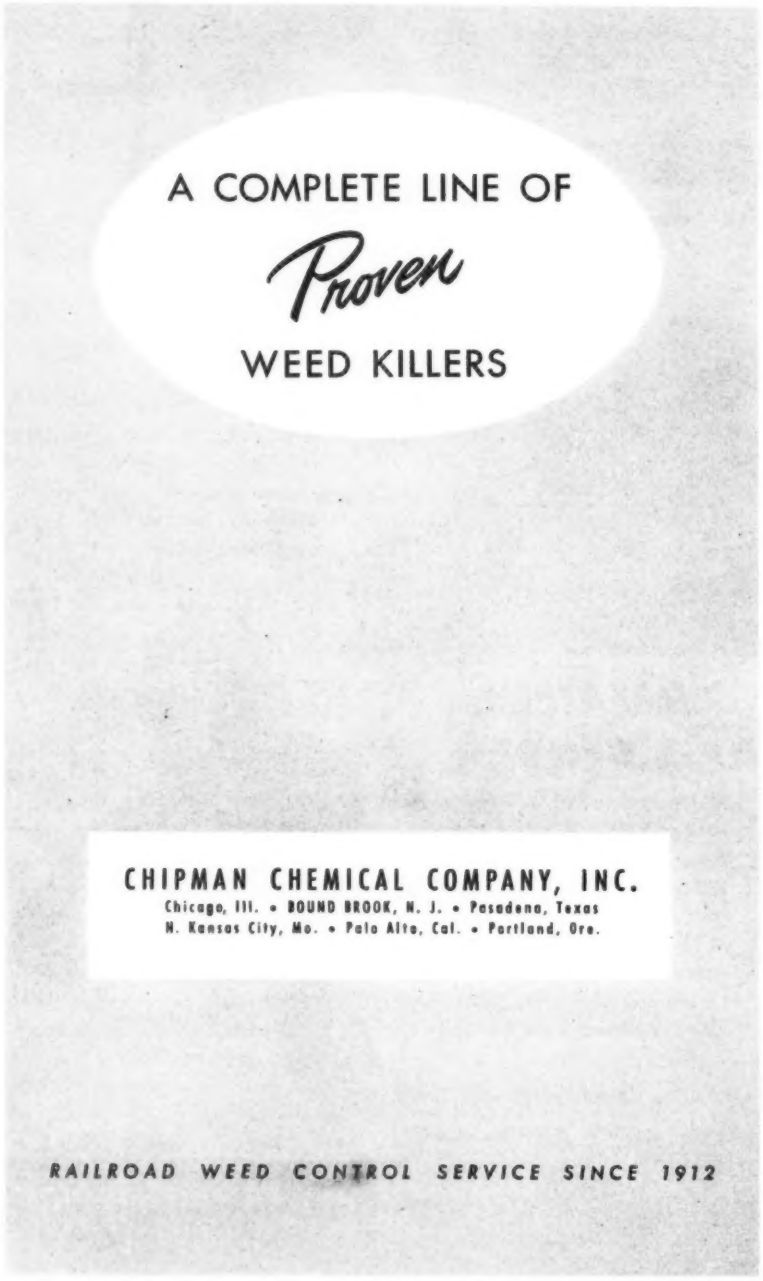
With 130 members and guests in attendance the December meeting was held on the 18th. The speaker was John W. Wheeler, executive assistant, Burlington Lines, who described the 71-mi. Centennial cutoff that the Burlington is building on its line between Chicago and Kansas City. He gave particular attention to those features of the design and construction which are calculated to reduce the cost of maintaining the cutoff.

At the January meeting, which will be held on the 27th at the usual place—Eitel's restaurant in the Field Building at Chicago—the speaker will be George R. McSwain, special agent in charge of the Chicago office of the Federal Bureau of Investigation at Chicago, whose subject will be the F.B.I. at Work.

American Railway Engineering Association

Nominations for the annual election of officers of the association have been announced. The nominations are as follows: President, T. A. Blair, chief engineer system, Atchison, Topeka & Santa Fe, Chicago; vice-president, C. G. Grove, chief engineer maintenance of way, Western region, Pennsylvania, Chicago; directors (four to be elected), W. C. Perkins, chief engineer, Union Pacific, Omaha, Neb.; R. J. Gammie, chief engineer, Texas & Pacific, Dallas, Tex.; E. S. Birkenwald, engineer of bridges, Southern, Cincinnati, Ohio; F. R. Smith, chief engineer, Union Railroad, East Pittsburg, Pa.; A. N. Laird, chief engineer, Grand Trunk Western, Detroit, Mich.; J. E. Hoving, district engineer, Northern Pacific, St. Paul, Minn.; L. L. Adams, assistant chief engineer, Louisville & Nashville, Louisville, Ky.; and Ray McBrian, engineer of standards and research, Denver & Rio Grande Western, Denver, Colo.

For members of the Nominating committee (five to be elected): L. H. Laffoley, engineer of buildings, Canadian Pacific, Montreal, Que.; C. J. Code, engineer of tests—maintenance of way, Pennsylvania, Philadelphia, Pa.; L. H. Powell, chief engineer, Atchison, Topeka & Santa Fe, Los Angeles, Cal.; H. E. Kirby, cost engineer, Chesapeake & Ohio, Richmond, Va.; W. E. Cornell, engineer of track, New York, Chicago & St. Louis, Cleveland, Ohio; J. F. Marsh, engineer of bridges, Chicago, Rock Island & Pacific, Chicago; W. G. Powrie, chief engineer, Chicago, Milwaukee, St. Paul & Pacific, Chicago;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N. Kansas City, Mo. • Palo Alto, Cal. • Portland, Ore.
RAILROAD WEED CONTROL SERVICE SINCE 1912

W. R. Swatosh, assistant engineer, Erie, Cleveland, Ohio; E. J. Brown, engineer of track, Burlington Lines, Chicago; and R. W. Seniff, engineer of tests, Baltimore & Ohio, Baltimore, Md.

In addition to the above names to be balloted on, C. J. Geyer, vice-president—construction and maintenance, Chesapeake & Ohio, Richmond, Va., will automatically be advanced from junior vice-president to senior vice-president.

Four committees have scheduled meetings for January. The Committee on Buildings will meet at the Roosevelt hotel, New Orleans, La., on January 25-26; the Committee on Masonry, Lord Baltimore hotel, Baltimore, Md., January 18-19; the Committee on Records and Accounts, Bellevue Stratford hotel, Philadelphia, Pa., January 17-18; and the Committee on Yards and Terminals, Statler Hotel, Buffalo, N. Y., January 17.

Bulletin 492 is to be mailed about the middle of January. This bulletin will contain the reports of the Committees on Masonry, Records and Accounts, Iron and Steel Structures, Wood Bridges and Trestles, Clearances, and Cooperative Relations with Universities.

Arthur J. McGinnis has been elected treasurer and a director of the **Simmons-Boardman Publishing Corporation,** publisher of this magazine and other railroad periodicals.

Walter A. McLean has been appointed manager of erection of the **Industrial Brownhoist Corporation,** Bay City Mich., succeeding the late **John J. Schreck.** Mr. McLean formerly worked in a sales and service capacity at Philadelphia, Pa.

Gar Wood Industries, Inc., Wayne, Mich., has announced the appointment of **Dwight L. Mink** and **Robert E. Owen** as district managers of the Midwest region and Southwest region, respectively. They will be responsible for the sale and service of Gar Wood hoists, dump bodies, winches, cranes and load packers in their respective territories.

Joseph V. Condon has been appointed assistant to vice-president of the **Canadian Railroad Service Company, Limited,** a unit of the Union Carbide & Carbon Corp., with headquarters at Toronto, Ont. He will carry on the duties of **H. V. Gigandet,** vice-president, who, after 25 years of service with the company, has requested a leave of absence for the next few months because of ill health, and who is contemplating application for retirement sometime next spring.

Supply Trade News

General

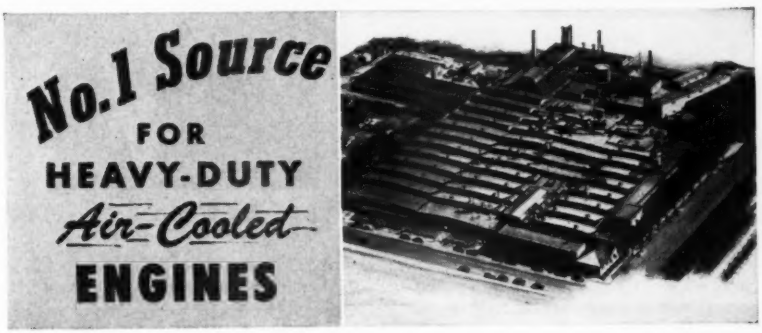
The **Caterpillar Tractor Company** has announced a voluntary allocation program to provide for equitable distribution of the company's heavy machinery this year. The program will apply to track-type tractors, cable controls, bulldozers, and motor graders.

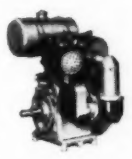
On December 29, 1950, the **Pullman-Standard Car Manufacturing Company,** Chicago, acquired the entire tractor allied equipment business of **Isaacson Iron Works** which has plants in Seattle, Wash., and Rockford, Ill. The phase of Isaacson's tractor allied parts activity now carried on at its Seattle plant will be transferred as soon as possible to Pullman-Standard's plant at Hammond, Ind. Operation of the plant at Rockford will be continued by Pullman-Standard.

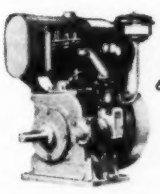
Personal

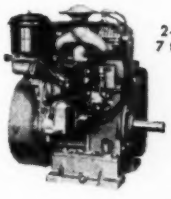
The **Dearborn Chemical Company** has appointed **D. B. Bishop** as manager of its Pittsburgh (Pa.) office to replace **J. A. Crenner,** who has retired after 37 years of service.

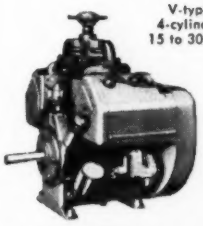
L. W. Jander has been appointed sales manager of the industrial division of **Henry Disston & Sons, Inc.** Mr. Jander succeeds **J. F. Wilkinson,** who has resigned to enter his own industrial distributing business in Miami, Fla.




Single-cylinder 3 to 6 hp.


Single-cylinder 6 to 9 hp.


2-cylinder 7 to 13 hp.


V-type 4-cylinder 15 to 30 hp.

As a potential or present user of 4-cycle internal combustion engines as power components on original equipment or as independent auxiliary power units, you will readily recognize the advantages of dealing with the outstanding leader in the heavy-duty air-cooled engine field.

Here, at the Wisconsin Motor Corporation plant there is nothing to divert attention from the highly specialized industrial operation of designing and building air-cooled engines. The entire resources and facilities of this organization are devoted to this single-minded project.

Because constant engineering effort and manufacturing skill are devoted wholly to the improvement and large volume production of WISCONSIN HEAVY-DUTY AIR-COOLED ENGINES, in a complete, general utility power range, you have the best assurance of dependable power units, ideally suited to your needs. Of equal importance, you have here, the most dependable source of supply both for engines and original factory parts.

Supporting this endeavor are key distributors of impressive recognition in the territories they serve, and a staff of competent Wisconsin Motor Corporation field men, in close liaison between factory and customer. Your interests are our primary interest.

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World's Largest Builders of Heavy-Duty Air-Cooled Engines
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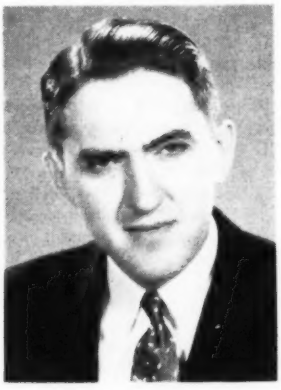
Supply Trade News (Cont'd)

The appointment of three district managers for the **Power Ballaster Products Division** of the **Pullman-Standard Car Manufacturing Company,** Chicago, has been announced by John A. Curtis, manager of the division. They are

George W. Morrow

John B. Bell



Robert C. Caldwell

George W. Morrow, who will be in charge of the Central and Southern district; **John B. Bell,** in charge of the Northeastern district; and **Robert C. Caldwell,** in charge of South and Southwestern sales.

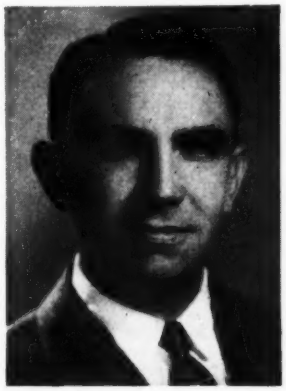
Mr. Morrow began his career with the New York, New Haven & Hartford, becoming track supervisor in 1916. He resigned from that road in 1926, to join the Ingersoll-Rand Company, remaining with that firm until 1940, when he entered business for himself in the maintenance-of-way equipment field. In 1942, Mr. Morrow became manager of railroad sales for the Construction Equipment Division of the Worthington Pump & Machinery Corp., serving in that position until May, 1949, when he became associated with Pullman-Standard.

Mr. Bell, a native of New England, also began his career with the New Haven. He has held a series of positions in the maintenance-of-way organization of that road, and in 1950, when he resigned to accept a position with Pullman-Standard, he was serving as engineer of track.

Mr. Caldwell began his business career with the Acme Steel Company, Riverdale, Ill. Following a tour of duty with the U. S. Army Air Force in World War II, he joined the engineering department of the Illinois Central at Clinton, Ill. Prior to joining Pullman-Standard he was engineer in charge of track work, signal work and valuation for the Jacksonville Terminal Company, Jacksonville, Fla.

The appointment of **Thomas C. Gray** as director of engineering for the **Pullman-Standard Car Manufacturing Company,** Chicago, has been announced by Wallace N. Barker, executive vice-president.

Franklin M. Finsthwait, eastern sales representative of the **Oxweld Railroad Service Division, Union Carbide & Carbon Corp.,** has been promoted to district sales manager, with headquarters at New York. A native of Pennsylvania, Mr. Finsthwait began his business career with the Penn Steel Castings Corporation in 1931, and, before joining Oxweld in 1937, was associated with the Bethlehem Steel Export Corporation.



Franklin M. Finsthwait

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Only **BURRO** *cranes have:*

- *Fast travel speeds—up to 22 M.P.H.*
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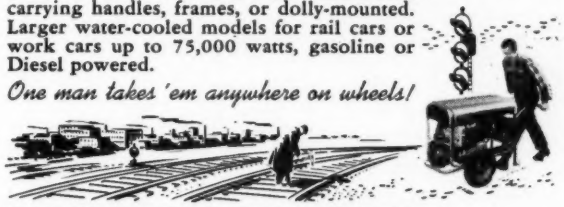
5 KW D.C. model with carrying frame.

Take an Onan portable electric plant to every right-of-way maintenance or construction job! It will supply quick "plug-in" electric power for cost-cutting, fast-working electric tools—drills, saws, nut runners, grinders, pipe threaders or any motor-driven equipment. Lightweight models from 400 to 5,000 watts A.C. or D.C., available with carrying handles, frames, or dolly-mounted. Larger water-cooled models for rail cars or work cars up to 75,000 watts, gasoline or Diesel powered.

One man takes 'em anywhere on wheels!



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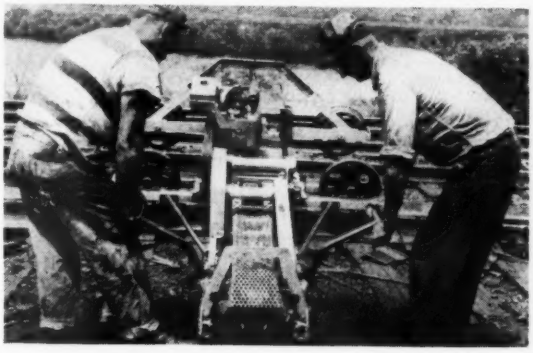
FOR RAILWAY USE

A BETTER *way to CLEAN CRIBS . . .*



NEW RTW P-46 BALLAST EXTRUDER

For lowering ballast in cribs before adzing ties, this new RTW machine embodies design and operating features that help speed rail replacement jobs and keep down costs. Rugged teeth mounted on an engine-driven endless chain speedily remove ballast to intertrack spaces or to shoulders without damaging ties. Cribs are cleaned to a uniform level, thus avoiding formation of water pockets.

Simple, compact design makes the RTW P-46 Extruder easy to move along track to and from location. A counterbalancing feature minimizes effort required by operator to raise and lower operating head while machine is in use.

Be sure to call or write immediately for full description and prices on this time- and cost-saving unit.

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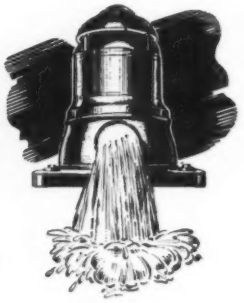

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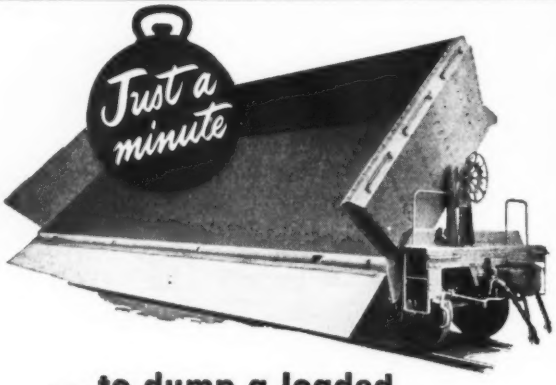

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No more waiting around by expensive labor while cranes unload gondolas or obsolete dump cars fail to operate. Only one man is needed to complete the dump cycle of one car or a whole string of cars. And it takes just sixty seconds to complete the operation.

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Because of expected shortages in both men and materials, 1951 will be a year of

- **GREATER MECHANIZATION and**
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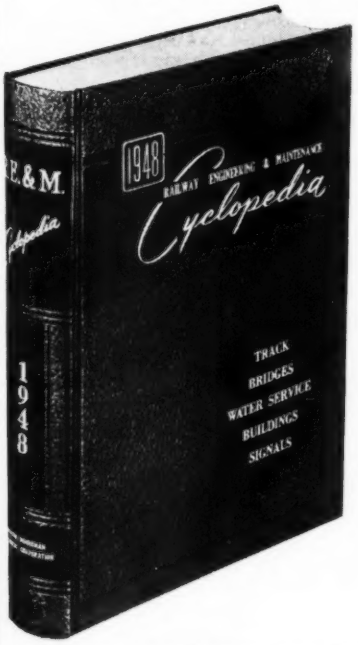

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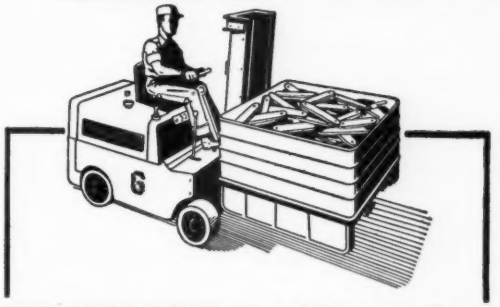

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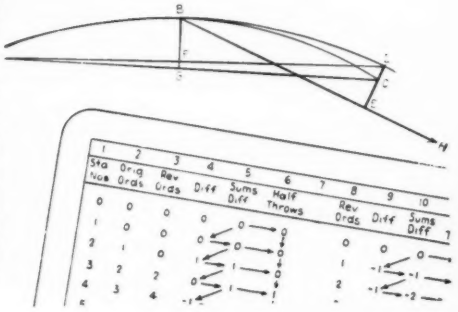

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American Creosoting Company, Inc. 16-17
Armco Drainage & Metal Products, Inc. 22
Armco Steel Corporation 22

B

Bethlehem Steel Company 3
Bogle Company, The R. H. 14
Buda Company, The 75

C

Caterpillar Tractor Company 15
Chapman Chemical Company 33
Chipman Chemical Company Inc. 76
Colonial Creosoting Company, Inc. 16-17
Cullen-Friestedt Co. 78

D

Dow Chemical Company, The 9
Duff-Norton Manufacturing Co., The 70
Dura-Tred Company 81

E

Eaton Manufacturing Company 2
Electric Tamper & Equipment Co. 6-7

F

Fairbanks, Morse & Co. 69
Fairmont Railway Motors, Inc. 34

G

G & H Rail Controls, Inc. 13
General Chemical Division 26
General Electric Company 65
Georgia Creosoting Company, Inc. 16-17

H

Homelite Corporation 71

I

Industrial Brownhoist Corporation 12
International Harvester Company 8

L

Layne & Bowler, Inc. 80
Lewis Bolt & Nut Co. 79

M

Magor Car Corporation 80
Michigan Power Shovel Company 74

N

National Lock Washer Company, The 83
Nordberg Mfg. Co. 31
Northwest Engineering Co. 5

O

Onan & Sons Inc., D. W. 79
Oxweld Railroad Service Division, Union Carbide and Carbon Corporation 36

P

P. & M. Co., The 1
Pacific Coast Borax Co. 73
Power Ballaster Products Division 24-25
Pullman-Standard Car Manufacturing Company 24-25

Q

Q and C Co., The 81

R

Racine Tool and Machine Company 4
Railway Age 29-30
Railway Track-work Co. 79
Reade Manufacturing Company, Inc. 67

S

Simmons-Boardman Publishing Corporation 80-82
Speno Railroad Ballast Cleaning Co., Inc., Frank 72
Sperry Products, Inc. 23
Sperry Rail Service 23

T

Templeton, Kenly and Company 81
Texas Company, The 84
Timken Roller Bearing Company, The 19

V

Viking Pump Company 81

W

Wisconsin Motor Corporation 77
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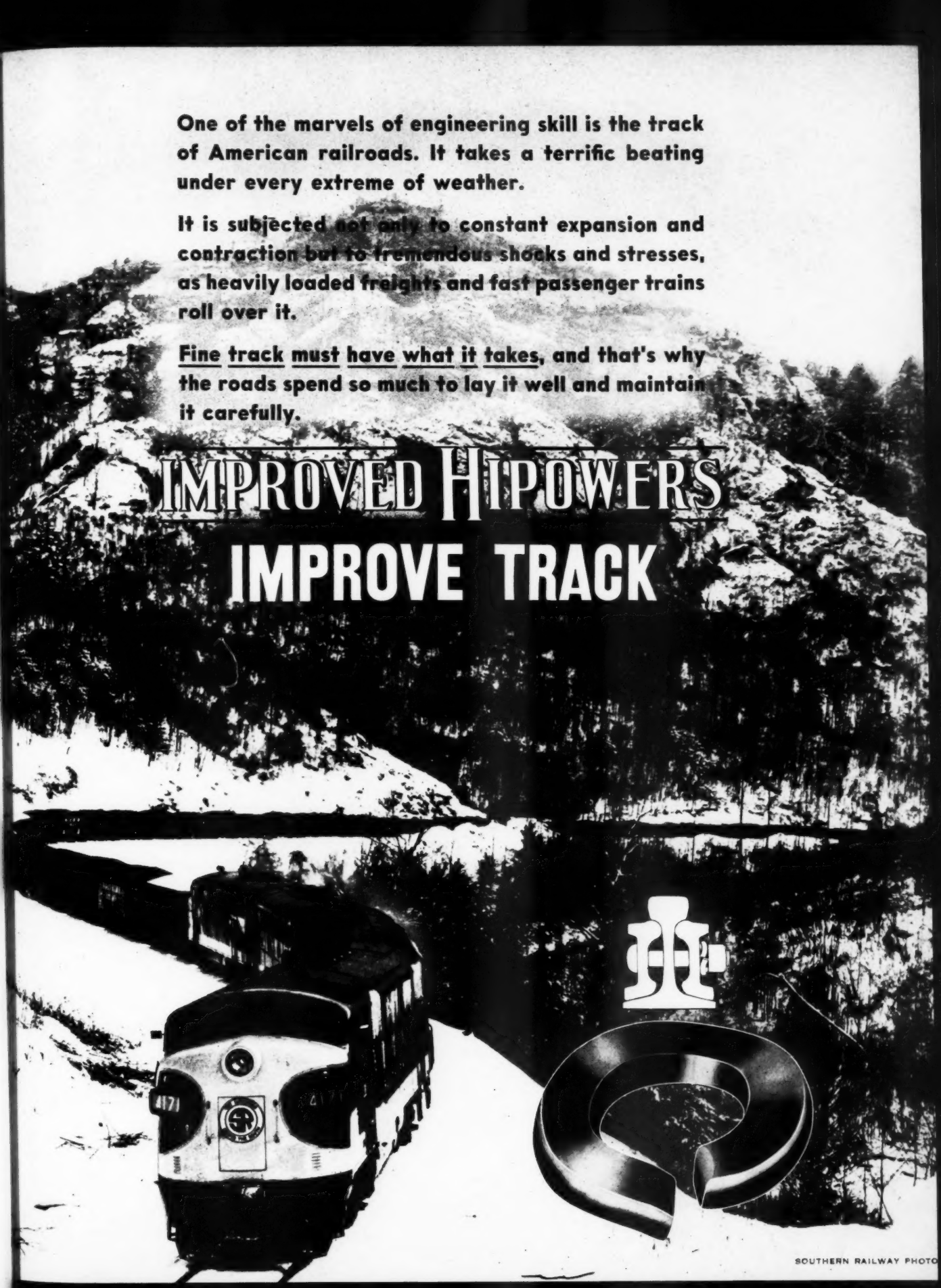

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